

MAY, 1926

62 25 Cents \$1 a Year

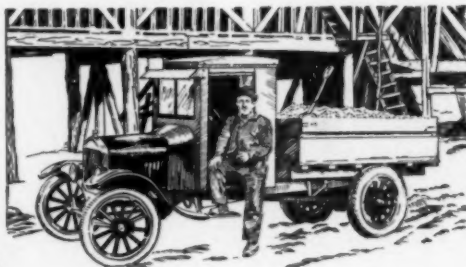
Contractors' *and* Engineers' Monthly

Building Demolition
with a pneumatic
See page 51.



BOOSTS HIS EARNINGS

\$25 A WEEK WITH THE FULLER AUXILIARY TRANSMISSION FOR FORD TRUCKS



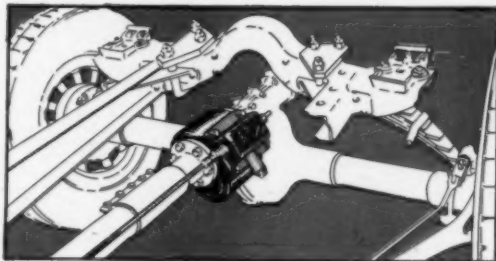
"I average \$1.00 to \$1.25 a load, and with my FULLER Auxiliary Transmission I can haul at least four more loads of gravel a day than can drivers whose trucks are not equipped with FULLERS," says Steve Collins, 1632 Lincoln Avenue, Kalamazoo, Mich.

"The FULLER helps me boost my earnings \$20 to \$25 a week. I can take bigger loads than any other Ford Truck in the pit, and outpull and outrun them all."

Mr. Collins' truck has a high speed worm gear, and he makes 25 to 30 miles an hour on the level, loaded with two tons of sand. With the FULLER he breezes up ordinary hills in intermediate, while others labor along in low. His FULLER increases his truck's pulling ability 80%. In the gravel pit he pulls through sand hub-deep without stalling.

In all lines of construction work this Auxiliary Transmission is proving its worth by speeding up the job and cutting costs. Its flexibility and increased pulling ability have a high money-making value, yet the FULLER is made so simply that it sells for only \$60.00, plus installation charge. Its quality is very high.

Ask your Ford Dealer about the FULLER Auxiliary Transmission.



PRICE \$60.00 F. O. B. FACTORY
West of the Rockies \$5 Additional

FULLER FEATURES

Four Speeds Forward—Two Reverse.
No Neutral Position (Ford Brakes Always Available).

No Added Strain on Motor, Universal Joint, or Drive Shaft.

No Rebuilding Necessary; No Cutting of Drive Shaft.

Installation, 2 to 3 Hours; No Special Tools Needed.

Very Simple and Easy to Operate.

Built by Fuller; Largest Manufacturers of Truck and Bus Transmissions in the World.

Fully Guaranteed for 90 Days Against All Defects.

Price—\$60 to Truck Owner.

FULLER AND SONS MFG., CO.

KALAMAZOO MICHIGAN

TRANSMISSION BUILDERS FOR 23 YEARS

AIR C
*Am.
*Buh
*Cur
*Dom
*Inge
*Nov
*O. H
*Sch
*Sull
Allie
Chic
Le L
Fair
Gard
Gene
Har
Nord
Nor
Stov
Unit
West
Wor
ABC L
Gene
West
E.
ABTES
*Inge
Am.
ASBES
*Phili
Keas
Mike
Norri
tov
Sall
ASH H
*Bay
*Byer
*Chica
*Geo.
*Mack
*Lake
*Head
*Ma
*Orion
C. O.
Brow
Chaim
Giffon
Green
Jeffre
Link
Porta
Robin
Webb
Welle
ASPHA
*Barbo
*Indic

Where to Purchase

A comprehensive classification of the leading machinery and supply manufacturers arranged for the convenience of contractors, engineers and public officials who may wish to secure information about construction equipment.

The Index to Advertisers faces the inside back cover. When writing to advertisers please mention the **CONTRACTORS' & ENGINEERS' MONTHLY**. A star (*) before the manufacturer's name indicates that his advertisement appears in this issue.

AIR COMPRESSORS

*Am. Stm. Pump Co., Battle Creek, Mich.
*Buhl Co., Chicago.
*Curtis Pn. Mch. Co., St. Louis, Mo.
*Domestic Eng. & Pump Co., Shippensburg, Pa.

*Ingersoll-Rand Co., N. Y.
*Hove Engine Co., Lansing, Mich.
*O. E. Clutch & Mch. Co., Columbia, Pa.
*Schramm, Inc., West Chester, Pa.
*Sullivan Mch. Co., Chicago
*Allis-Chalmers Mfg. Co., Milwaukee.
*Chicago Pneumatic Tool Co., N. Y.
*Le Laval Stm. Turb. Co., Trenton, N. J.
*Fairbanks, Morse & Co., Chicago.
*Gardner Governor Co., Quincy, Ill.
*General Elec. Co., Schenectady, N. Y.
*Hardie-Tynes Mfg. Co., Birmingham, Ala.
*Nordberg Mfg. Co., Milwaukee.
*Norwalk Ir. Wks. Co., So Norwalk, Ct.
*Stover Mfg. & Eng. Co., Chicago
*United Iron Wks., Kans. City, Mo.
*Westinghouse Trac. Brake Co., Wilmerding, Pa.
*Worthington Pump & Mch. Corp., N. Y.

ARC LAMPS

*General Elec. Co., Schenectady, N. Y.
*Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

ARTESIAN WELL DRILLS & PUMPS

*Ingersoll-Rand Co., New York
*Am. Well Works, Aurora, Ill.

ASBESTOS PRODUCTS

*Phillip Carey Co., Cincinnati.
*Kearney & Mattison Co., Ambler, Pa.
*Mikesell Bros. Co., Wabash, Ind.
*Norristown Mag. & Ash. Co., Norristown, Pa.
*Sall Mountain Co., Chicago.

ASH HANDLING MACHINERY

*Bay City Dredge Wks., Bay City, Mich.
*Byers Mach. Co., Ravenna, O.
*Chicago Automatic Conv. Co., Chicago
*Geo. Haiss Mfg. Co., N. Y.
*Mack Trucks, Inc., N. Y.
*Lakewood Eng. Co., Cleveland, O.
*Mead-Morrison Mfg. Co., E. Boston, Mass.

*Orton Crane & Shovel Co., Chicago
*C. O. Bartlett & Snow Co., Cleveland, O.
*Brown Hoisting Mach. Co., Cleveland, O.
*Chain Belt Co., Milwaukee, Wis.
*Gifford-Wood Co., Hudson, N. Y.
*Green Eng. Co., E. Chicago, Ind.
*Jeffrey Mfg. Co., Columbus, O.
*Link-Belt Co., Chicago.
*Portable Mach. Co., Passaic, N. J.
*Robbins Conv. Belt Co., N. Y.
*Webster Mfg. Co., Chicago.
*Weller Mfg. Co., Chicago.

ASPHALT

*Barber Asphalt Co., Philadelphia.

*Barrett Co., N. Y.
*Ky. Rock Asph. Co., Louisville, Ky.
*Standard Oil Co. (Ind.), Chicago.
*Texas Co., N. Y.
*Warren Bros. Co., Boston.
*Atlantic Ref. & Asph. Corp., Phila.
*Gulf Refining Co., Pittsburgh
*Headley Good Roads Co., Phila.
*New Orleans Ref. Co., New Orleans.
*Pioneer Asph. Co., Lawrenceville, Ill.
*Sinclair Ref. Co., Chicago.
*Standard Oil Co. of Cal., S. Francisco.
*Standard Oil Co. of La., N. Orleans.
*Standard Oil Co. of N. J., Newark.
*Standard Oil Co. of N. Y., N. Y.

ASPHALT BLOCK

*Hastings Pavement Co., N. Y.

ASPHALT CUTTERS

*Ingersoll-Rand Co., N. Y.
*Sullivan Machinery Co., Chicago.
*Chicago Pneumatic Tool Co., N. Y.
*Cleveland Rock Drill Co., Cleveland, O.
*Dayton Pneum. Tool Co., Dayton, O.
*Independent Pa. Tool Co., Aurora, Ill.

ASPHALT KETTLES (See Kettles for Asphalt and Tar Heating)

ASPHALT PLANTS, TOOLS, ETC.

*Aeroll Burner Co., Union Hill, N. J.
*Barber Asphalt Co., Philadelphia.
*Chausse Oil Burner Co., Elkhart, Ind.
*Littleford Bros., Cincinnati, O.
*Warren Bros. Co., Boston.
*Edw. R. Bacon Co., S. Francisco.
*Chase & Lyman, Boston.
*F. D. Cummer & Son Co., Cleveland, O.
*J. D. Farasey Co., Cleveland, O.
*Hetherington & Berner, Indianapolis.
*Mosher Mfg. Co., Chicago, Ill.

ASPHALT ROLLERS (See Road Rollers)

ASPHALT SURFACE HEATERS

*Aeroll Burner Co., Union Hill, N. J.
*Barber Asphalt Co., Philadelphia.
*Chausse Oil Burner Co., Goshen, Ind.
*Equitable Asp. Maint. Co., Kan. C. Mo.
*Hauck Mfg. Co., B'klyn, N. Y.

BACKFILLERS

*Am. Cem. Mch. Co., Inc., Keokuk, Ia.
*Baker Mfg. Co., Springfield, Ill.
*Bay City Dredge Wks., Bay City, Mich.
*Buckeye Trac. Ditcher Co., Findlay, O.
*Byers Machine Co., Ravenna, O.
*Construction Mch. Co., Waterloo, Ia.
*Harnischfeger Corp., Milwaukee, Wis.
*Kochring Co., Milwaukee, Wis.
*Miami Trailer-Scrapper Co., Troy, O.
*Orton Crane & Shovel Co., Chicago
*Austin Mach. Corp., Muskegon, Mich.
*Ersted Mch. Mfg. Co., Portland, Ore.

Parsons Co., Newton, Ia.
*Speeder Mch. Corp., Fairfield, Ia.
*Weller Mfg. Co., Chicago.

BAR BENDERS AND CUTTERS

*Kochring Co., Milwaukee, Wis.
*Ransome Conc. Mch. Co., Dunellen, N.J.
*Buffalo Forge Co., Buffalo, N. Y.
*Concrete Steel Co., N. Y.
*Electric Welding Co., Pittsburgh.
*D. A. Hiaman & Co., Sandwich, Ill.
*J. L. Gleason & Co., Boston, Mass.
*McKenna Co., Cleveland, O.

BAR CHAIRS, REINFORCING

*Truscon Steel Co., Youngstown, O.
*Concrete Steel Co., N. Y.
*Universal Form Clamp Co., Chicago

BAR TIES

*Bates Valve Bag Co., Chicago.

BATCH BOXES

*Easton Car & Const'n Co., Easton, Pa.
*Lakewood Eng. Co., Cleveland, O.
*Easton Car & Const'n Co. of Mo., Kansas City, Mo.
*Western Wheeled Scraper Co., Aurora, Ill.

BINS, STORAGE

*Atlas Eng. Co., Milwaukee, Wis.
*Austin-Western Rd. Mach. Co., Chicago.
*Blaw-Knox Co., Pittsburgh, Pa.
*Easton Car & Const'n Co., Easton, Pa.
*Erie Steel Const. Co., Erie, Pa.
*Fairfield Eng. Co., Marion, O.
*Gallon Iron Wks. & Mfg. Co., Gallon, O.
*Good Roads Mch. Co., Kennett Sq., Pa.
*Ransome Conc. Mch. Co., Dunellen, N.J.
*Russell Grader Mfg. Co., Minneapolis.
*Universal Rd. Mach. Co., Kingston, N. Y.
*Austin Mfg. Co., Chicago.
*Birmingham Tank Co., Birmingham, Ala.
*Brown Hoisting Mch. Co., Cleveland.
*Link-Belt Co., Chicago.
*Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
*Weller Mfg. Co., Chicago.

BLAST HOLE DRILLING MACHINES (See "Well Drilling and Blast Hole Machines")

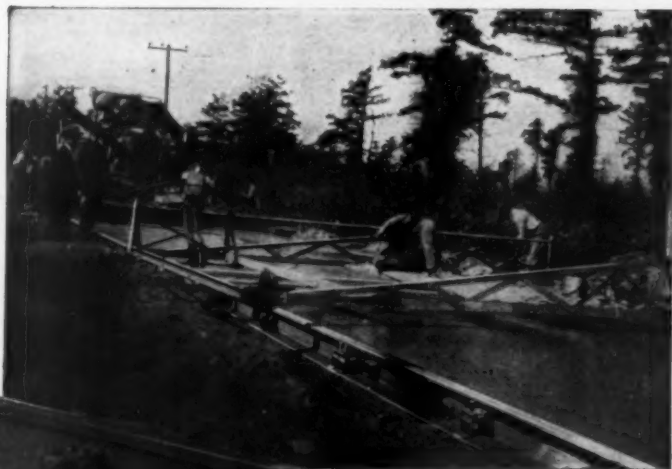
BLASTING POWDER (See Explosives)

BLOCKS AND TACKLE

*Boston & Lockport Bk. Co., E. Boston, Mass.
*Debbie Fdry. & Mach. Co., Niagara Falls, N. Y.
*Western Block Co., Lockport, N. Y.
*Upson-Walton Co., Cleveland, O.

Indicates that the manufacturer carries an advertisement. See index facing inside back cover.

Truscon Steel Road Forms are made from 3-16 in. material throughout and all connections are securely riveted. They are built solidly, and will support the heaviest finishing equipment without warping or bulging. Note the sliding end connection and bearing end which holds the form perfectly in line.



More Speed— Better Work—Lower Cost with Truscon Steel Road Forms

Truscon Steel Road Forms enable the contractor to do better work in quicker time and at lower cost. They embody many outstanding features and improvements. Their simplicity saves time in placing. Accuracy in alignment is assured by patented sliding connections, which lock the forms together securely in a perfect

line. Their ample dimensions assure unusual rigidity and durability. They are built for permanent service. With ordinary care Truscon Steel Road Forms will last indefinitely. Truscon Highway Engineers are at your disposal to help solve your paving problems.

Write now for full information

TRUSCON STEEL COMPANY, Youngstown, Ohio

Warehouses and Offices in All Principal Cities.

Railroad Dept., 166 E. Erie St., Chicago, Ill.

Foreign Trade Division, New York.

The Truscon Laboratories, Detroit, Mich.

Trussed Concrete Steel Co. of Canada, Ltd., Walkerville, Ont.

TRUSCON STEEL ROAD FORMS

***A complete line of Truscon Products for better roads built better—Wire Mesh for permanence—Contraction Joints for safety—Rib Bars for reinforcing—Curb Bars for curb protection.**

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Where to Purchase

5

BLUE PRINT MACHINES

Paragon Mach. Co., Rochester, N. Y.
C. F. Pease Co., Chicago.
Wickes Bros., Saginaw, Mich.

BOILERS

*S. Flory Mfg. Co., Bangor, Pa.
Johnston Bros., Inc., Ferrysburg, Mich.
Chandler & Taylor Co., Indianapolis.
Chatt. Boiler & Tank Co., Chatta., Tenn.
E. D. Cole Mfg. Co., Newnan, Ga.
Erie City Iron Wks., Erie, Pa.
Hartley Blr. Wks., Montgomery, Ala.
Heine Boiler Co., St. Louis, Mo.
E. Keeler Co., Williamsport, Pa.
Ladd Water Tube Blr. Co., Pittsburgh, Pa.
V. Loeffel & Co., Springfield, O.
Lord & Burnham Co., Irvington, N.Y.
Murray Iron Wks. Co., Burlington, Ia.
New Bern Iron Wks. & Sup. Co., New Bern, N. C.
Petroleum Iron Wks. Co., Sharon, Pa.
Schofield Iron Wks., Macon, Ga.
Stanwood Corp., Cincinnati, O.
Superior Body Corp., Marion, Ind.
Taylor Eng. & Mfg. Co., Allentown, Pa.
Valk & Murdoch Co., Charleston, S. C.
Vogt Mch. Co., Inc., Louisville, Ky.
Walch & Weidner Blr. Co., Chattanooga, Tenn.

BRACES, TRENCH

Jas. H. Channon Mfg. Co., Chicago.
Duff Mfg. Co., Pittsburgh, Pa.
Kalamazoo Fdry. & Mach. Co., Kalamazoo, Mich.
Waldo Bros. & Bond Co., Boston.

BRANDING TOOLS

*Everhot Mfg. Co., Maywood, Ill.

BRASS GOODS

*Union Water Meter Co., Worcester, Mass.
Glauber Brass Mfg. Co., Cleveland, O.
Haydenville Co., Haydenville, Mass.
Hays Mfg. Co., Erie, Pa.
Mueller Company, Decatur, Ill.
United Brass Mfg. Co., Cleveland, O.

BREAKERS, CONCRETE

*Backeye Trac. Ditcher Co., Findlay, O.
*Ingersoll-Rand Co., N. Y.
Chicago Pneumatic Tool Co., N. Y.
Cleveland Rock Drill Co., Cleveland, O.

BRICK, PAVING (See Paving Brick)

BRIDGES AND BUILDINGS, STEEL

*Blaw-Knox Co., Pittsburgh, Pa.
*Russell Grader Mfg. Co., Minneapolis.
*Frederick Snare Corporation, N. Y.
Amer. Bridge Co., N. Y.
Bellefontaine Br. & Stil. Co., Bellefontaine, O.
Belmont Iron Wks., Phila.
Berlin Constr. Co., Berlin, Conn.
Bethlehem Steel Co., Bethlehem, Pa.
Boston Bridge Wks., Boston.
Central States Br. Co., Ind'polis, Ind.
Champion Bridge Co., Wilmington, O.
Chesapeake Ir. Wks., Baltimore, Md.
Chicago Br. & I. Wks., Chicago.
Clinton Bridge Wks., Clinton, Ia.
Eastern Bridge & Struc. Co., Worcester, Mass.
Flour City Orn. Iron Co., Minneapolis.
Fort Pitt Br. Wks., Pittsburgh, Pa.
Ingalls Ir. Wks. Co., Birmingham, Ala.
Inter. Stil. & Ir. Co., Evansville, Ind.
Louisville Br. & Ir. Co., Louisville, Ky.
McClintic Marshall Co., Pittsburgh, Pa.
Milwaukee Br. Co., Milwaukee, Wis.
Minn. Stil. & Mch. Co., Minneapolis.
Missouri Vy. Br. & Ir. Co., Leavenworth, Kan.
Morava Constr. Co., Chicago.

Mt. Vernon Br. Co., Mt. Vernon, O.
Penn. Bridge Co., Beaver Falls, Pa.
Pittsburgh-Des Moines Stil. Co., Pittsburgh, Pa.
Richmond Struc. Stil. Co., Richmond, Va.
Riverside Br. Co., Martins Ferry, O.
Virginia Br. & Ir. Co., Roanoke, Va.
Wisc. Br. & Ir. Co., No. Milwaukee, Wis.

BRONZE TABLETS

Flour City Orn. Ir. Co., Minneapolis.
Imperial Brass Mfg. Co., Chicago.
J. L. Mott Iron Wks., N. Y.

BROOMS (See Street Sweeping Brooms)

BUCKETS, AUTOMATIC DUMPING

*Lakewood Eng. Co., Cleveland, O.
*Littleford Bros., Cincinnati, O.
*G. L. Stuebner Ir. Wks., Inc., Long Island City, N. Y.
*Union Iron Wks., Inc., Hoboken, N. J.

BUCKETS, CLAM SHELL

*Blaw-Knox Co., Pittsburgh, Pa.
*Geo. Hais Mfg. Co., N. Y.
*J. F. Kiesler Co., Chicago.
*Lakewood Eng. Co., Cleveland, O.
*Mead-Morrison Mfg. Co., E. Boston.
*Orton Crane & Shovel Co., Chicago.
Brown Hoisting Mach. Co., Cleveland, O.
Browning Crane Co., Cleveland, O.
F. A. Coleman Co., Cleveland, O.
Erie Steel Const'n Co., Erie, Pa.
Hayward Co., N. Y.
Industrial Wks., Bay City, Mich.
Link-Belt Co., Chicago.
McMyler Interstate Co., Cleveland, O.
Owen Bucket Co., Cleveland, O.
G. H. Williams Co., Erie, Pa.

BUCKETS, CONCRETE

*Insley Mfg. Co., Indianapolis, Ind.
*Lakewood Eng. Co., Cleveland, O.
*Ransome Conc. Mch. Co., Dunellen, N. J.
*G. L. Stuebner Ir. Wks., Inc., Long Island City, N. Y.
*Union Iron Works, Inc., Hoboken, N. J.
Koppel Ind. Car & Equip. Co., Koppel, Pa.

BUCKETS, DRAGLINE

*Dobbie Fdry. & Mch. Co., Niagara Falls, N. Y.
*Gallon Ir. Wks. & Mfg. Co., Gallon, O.
*Pioneer Bucket Co., Indianapolis, Ind.
*Russell Grader Mfg. Co., Minneapolis.
*Sauerman Bros., Chicago.
Am. Mfg. & Eng. Co., Kalamazoo, Mich.
Page Eng. Co., Chicago.

BUCKETS, DREDGING AND EXCAVATING

*Blaw-Knox Co., Pittsburgh, Pa.
*Geo. Hais Mfg. Co., N. Y.
*J. F. Kiesler Co., Chicago.
*Lakewood Eng. Co., Cleveland, O.
*Mead-Morrison Mfg. Co., E. Boston.
*Orton Crane & Shovel Co., Chicago.
Brown Hoisting Mach. Co., Cleveland, O.
Browning Crane Co., Cleveland, O.
Hayward Co., N. Y.
Owen Bucket Co., Cleveland, O.
G. H. Williams Co., Erie, Pa.

BUCKETS, ORANGE PEEL

*J. F. Kiesler Co., Chicago.
*Mead-Morrison Mfg. Co., E. Boston.
*Orton Crane & Shovel Co., Chicago.
Hayward Co., N. Y.
Industrial Wks., Bay City, Mich.
McMyler Interstate Co., Cleveland, O.

BUILDINGS, STEEL (See Bridges)

BUNKS AND COTS

Ft. Pitt Bedding Co., Pittsburgh, Pa.
Haggard & Marcussen Co., Chicago.
Southern Rome Co., Baltimore, Md.

CABLES (See Wire and Cables)

CABLEWAYS

*S. Flory Mfg. Co., Bangor, Pa.
*Mead-Morrison Mfg. Co., E. Boston.
*Russell Grader Mfg. Co., Minneapolis.
*Sauerman Bros., Chicago.
*Street Bros. Mach. Wks., Chattanooga.
Broderick & Bascom Rope Co., St. Louis, Mo.
Lidgerwood Mfg. Co., N. Y.
J. A. Roebbing Sons Co., Trenton, N.J.
Waterbury Co., N. Y.

CABLEWAYS, SLACKLINE

*Russell Grader Mfg. Co., Minneapolis.
*Sauerman Bros., Chicago.
*Street Bros. Mach. Wks., Chattanooga

CAISSONS

American Bridge Co., N. Y.
Birmingham Tank Co., Birmingham, Ala.
Foundation Co., N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
O'Rourke Eng. Constr. Co., N. Y.
Petroleum Ir. Wks. Co., Sharon, Pa.

CALCIUM CHLORIDE FOR ROADS

*Dow Chemical Co., Midland, Mich.
*Solway Process Co., Syracuse, N. Y.
Carbondale Calcium Co., Carbondale, Pa.

CANS FOR GARBAGE AND REFUSE

American Can Co., N. Y.
Butler Mfg. Co., Minneapolis.
Economy Baler Co., Ann Arbor, Mich.
Rochester Can Co., Rochester, N. Y.
Solar-Sturges Mfg. Co., Chicago.
Steel Basket Co., Cedar Rapids, Ia.

CARS, INDUSTRIAL V. DUMPING

*Easton Car & Const. Co., Easton, Pa.
*Insley Mfg. Co., Indianapolis, Ind.
*Lakewood Eng. Co., Cleveland, O.
*G. L. Stuebner Ir. Wks., Inc., Long Island City, N. Y.
Atlas Car & Mfg. Co., Cleveland, O.
Austin Mach. Corp., Muskegon, Mich.
Chase Fdry. & Mfg. Co., Columbus, O.
C. W. Hunt Co., New Brighton, N. Y.
Koppel Ind. Car & Equip. Co., Koppel, Pa.
United Ir. Wks., Inc., Kans. City, Mo.
Weller Mfg. Co., Chicago.
Whiting Corp., Harvey, Ill.

CARTS, CONCRETE

*Akron Barrow Co., Cleveland, O.
*Easton Car & Const. Co., Easton, Pa.
*Insley Mfg. Co., Indianapolis, Ind.
*Jackson Mfg. Co., Harrisburg, Pa.
*Lakewood Eng. Co., Cleveland, O.
*Lansing Co., Lansing, Mich.
*Littleford Bros., Cincinnati, O.
*Ransome Conc. Mch. Co., Dunellen, N.J.
*T. L. Smith Co., Milwaukee.
*Teledo Wheelbarrow Co., Toledo, O.
Chattanooga Wheelbarrow Co., Chattanooga, Tenn.
Cleveland Wheelbarrow Co., Cleveland, O.
F. D. Etnyre & Co., Oregon, Ill.
Gray Iron Fdry. Co., Reading, Pa.
Lee Trailer & Body Co., Chicago.
Sterling Wheelbarrow Co., Milwaukee

CAST IRON PIPE (See Pipe, Cast Iron)

CASTINGS, STREET AND SEWER

*Rurch Plow Wks. Co., Crestline, O.
*Gallon Ir. Wks. & Mfg. Co., Gallon, O.
*U. S. Cast Ir. Pipe & Fdry. Co., Burlington, N. J.

Indicates that the manufacturer carries an advertisement. See index facing inside back cover.



"The ERIE is the best balanced machine we have ever used. Our ERIES have never lost any time and have performed beyond our expectations."—*Tri-State Engineering Co., Cumberland, Md.* (Own 2 ERIES).

Thousands of shovel owners feel this way about the ERIE. You can depend on any size or type of excavating machine that bears the ERIE nameplate.

The latest and best steam ERIE is the B-2 "Dreadnaught"—have you seen one in action?

The first question to ask about any shovel is: "What's back of it?"



Just as fast and smooth as a steam shovel—and as easy to control. Digs much more than any single-engine shovel.

Digs harder material—as the full power of the big 4-cylinder gas engine, direct-connected for hoisting, can be used at the same time as the full power of the direct-connected air engines for crowding and swinging.

"I was satisfied that before ERIE put a gasoline shovel on the market it would be right" ---

—that's what D. L. Dennis, of Smethport, Pa., wrote after completing a job with a Gas+Air ERIE that had seen 14 months of service—and placing his order for another Gas+Air ERIE.

His confidence in any kind of ERIE Shovel is something for us to be proud of.

The buyer who has had business dealings with the Erie Steam Shovel Company feels safe in buying any "ERIE Shovel" product, because:

- (1) More than 3,800 ERIES in service—far more revolving shovels than of any other make—and not one has ever failed to do all we represented, or more.
- (2) Hundreds of comparative records show that ERIES give larger output, and cost

only about $\frac{1}{3}$ as much for upkeep, with a corresponding saving in working time.

(3) The simple and sturdy design and the more careful workmanship are evident to anyone who knows machinery.

(4) Sometimes "ERIE" is first on the market with a new thing, sometimes last—but it's always right before customers can buy it. We do not permit our customers to take chances with untried machines.

You can buy a gasoline shovel with the "ERIE" nameplate, and it is right. The reports from owners all over the country have shown that it is right.

And the very fact that we are willing to sell you this shovel is proof enough that it is right.

ERIE STEAM SHOVEL CO., Erie, Pa., U. S. A.

Builders of ERIE Shovels, Cranes, Ditchers, Draglines,
Trench
Hoes, etc.
and

Fully protected
by basic patents

ERIE

GAS+AIR Shovel and Crane

Branch Offices: Boston, New York, Philadelphia,
Pittsburgh, Atlanta, Chicago

Representatives throughout the U. S. A.

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you,

Where to Purchase

7

Canton Fdry. & Mach. Co., Canton, O.
Casey-Hedges Co., Chattanooga, Tenn.
Central Fdry. Co., N. Y.
J. B. Clow & Sons, Chicago.
W. E. Dee Co., Chicago.
Elkhart Fdry. & Mach. Co., Elkhart, Ind.
Foundry Mfg. Co., St. Albans, Vt.
Gilbert Mfg. Co., Aberdeen, S. Dak.
Klauser Mfg. Co., Dubuque, Ia.
Madison Fdry. Co., Cleveland, O.
Pechstein Iron Works, Keokuk, Ia.
Portable Mach. Co., Passaic, N. J.
Sessions Foundry Co., Bristol, Conn.
South Bend Fdry. Co., So. Bend, Ind.

CATCH BASINS (See Castings, Street)

CATCH BASIN CLEANING OUTFITS

*Mack Trucks, Inc., N. Y.
Elgin Sales Corp., N. Y.
Movakan Co., Indianapolis, Ind.

CAULKING MACHINERY AND TOOLS

*Ingersoll-Rand Co., N. Y.
Cleveland Rock Drill Co., Cleveland, O.
Helwig Mfg. Co., St. Paul, Minn.
Mueller Company, Decatur, Ill.

CEILINGS, METAL

Berger Mfg. Co., Canton, O.
Canton Art Metal Co., Canton, O.
Globe Iron Roofing & Cor. Co., Cincinnati, O.
Newport Rolling Mill Co., Newport, Ky.
Klauser Mfg. Co., Dubuque, Ia.
Geo. L. Mesker & Co., Evansville, Ind.
Milwaukee Corr. Co., Milwaukee.
Wheeling Corr. Co., Wheeling, W. Va.

CEMENT (P. C. stands for Portland Cement)

*Pennsylvania Cement Co., N. Y.
Acme Cement Corp., Catskill, N. Y.
Etna P. C. Co., Detroit, Mich.
Alabama P. C. Co., Birmingham, Ala.
Allentown P. C. Co., Allentown, Pa.
Alpha P. C. Co., Easton, Pa.
Ash Grove Lime and P. C. Co., Kansas City, Mo.
Atlas P. C. Co., N. Y.
Beaver P. C. Co., Portland, Ore.
Bessemer Limestone & C. Co., Youngstown, O.
British Col. Cement Co., Victoria, B. C.
Canada Cement Co., Ltd., Montreal, Canada.
Cincinnati P. C. Corp., Kingsport, Tenn.
Colorado P. C. Co., Denver, Colo.
Cowell P. C. Co., Cowell, Cal.
Crescent P. C. Co., Wampum, Pa.
Dewey P. C. Co., Kansas City, Mo.
Dexter P. C. Co., Nazareth, Pa.
Diamond P. C. Co., Cleveland, O.
Dixie P. C. Co., Chattanooga, Tenn.
Edison P. C. Co., N. Y.
Georgia Cement & Stone Co., Birmingham, Ala.
Giant P. C. Co., Philadelphia, Pa.
Glens Falls P. C. Co., Glens Falls, N. Y.
Golden State P. C. Co., Los Angeles, Cal.
Great West'n P. C. Co., Kansas City, Mo.
Hawkeye P. C. Co., Des Moines, Ia.
Hercules Cement Corp., Philadelphia.
Hermitege P. C. Co., Nashville, Tenn.
Huron P. C. Co., Detroit, Mich.
Indiana P. C. Co., Indianapolis, Ind.

International Cement Corp., N. Y.
International P. C. Co., Ltd., Spokane, Wash.
Kansas P. C. Co., Kansas City, Mo.
Knickerbocker P. C. Co., Inc., N. Y.
Kosmos P. C. Co., Louisville, Ky.
La Tolteca Compania de Cemento Portland, Mexico City, Mex.
Lawrence P. C. Co., Northampton, Pa.
Lehigh P. C. Co., Allentown, Pa.
Louisville Cement Co., Louisville, Ky.
Manitowoc P. C. Co., Manitowoc, Wis.
Mariboro Cement Co., Edmonton, Can.
Marquette Cement Mfg. Co., Chicago.
Missouri P. C. Co., St. Louis, Mo.
Monarch Cement Co., Humboldt, Kans.
Monolith P. C. Co., Los Angeles, Cal.
National Cement Co., Birmingham, Ala.
Nazareth Cement Co., Nazareth, Pa.
Nebraska Cement Co., Denver, Colo.
Newago P. C. Co., Newago, Mich.
New Egyptian P. C. Co., Detroit.
North Amer. Cement Corp., Albany.
Northwestern States P. C. Co., Mason City, Ia.
Oklahoma P. C. Co., Denver.
Olympic P. C. Co., Ltd., Seattle.
Oregon P. C. Co., Portland, Ore.
Pacific P. C. Co., San Francisco.
Peerless P. C. Co., Union City, Mich.
Peninsular P. C. Co., Cement City, Mich.
Penn-Allen Cement Co., Allentown, Pa.
Petoskey P. C. Co., Petoskey, Mich.
Phoenix P. C. Co., Nazareth, Pa.
Pgh. Plate Glass Co., Pittsburgh, Pa.
P. C. Co. of Utah, Salt Lake City.
Pyramid P. C. Co., Des Moines.
Riverside P. C. Co., Los Angeles.
St. Marys Cement Co., Toronto, Can.
San Antonio P. C. Co., San Antonio.
Sandusky Cement Co., Cleveland, O.
Santa Cruz P. C. Co., San Francisco.
Signal Mountain P. C. Co., Chatta, Tenn.
Southern States P. C. Co., Rockport, Ga.
Southwest'n P. C. Co., El Paso, Tex.
Sun P. C. Co., Portland, Ore.
Superior P. C. Co., Seattle, Wash.
Texas P. C. Co., Dallas, Tex.
Three Forks P. C. Co., Denver, Colo.
Tidewater P. C. Co., Baltimore, Md.
Trinity P. C. Co., Dallas, Tex.
Union P. C. Co., Ogden, Utah.
U. S. P. C. Co., Denver, Colo.
Universal P. C. Co., Chicago.
Utah Idaho Cement Co., Ogden, Utah.
Vulcanite P. C. Co., Philadelphia.
Wabash P. C. Co., Detroit.
Wolverine P. C. Co., Coldwater, Mich.
Wyandotte P. C. Co., Detroit.

CEMENT BLOCK MACHINES

*Cement Block Mach. Co., Newark, N. J.

CEMENT GUNS

Cement Gun Co., Allentown, Pa.

CEMENT INSPECTION (See Inspecting Laboratories)

CEMENT TOOLS

*Abrams Cement Tool Co., Detroit

CENTRIFUGAL PUMPS (See "Pumps, Centrifugal")

CHAINS

Amer. Chain Co., Inc., Bridgeport, Conn.
Chain Belt Co., Milwaukee, Wis.
Columbus McKinnon Chain Co., Columbus, O.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Chicago.
U. S. Chain & Forge Co., Pittsburgh, Pa.
Webster Mfg. Co., Chicago.
Weller Mfg. Co., Chicago.

CHIMNEYS, CONCRETE

Heine Chimney Co., Chicago
Rust Engineering Co., Pittsburgh, Pa.
Weber Chimney Co., Chicago

CHIMNEYS, RADIAL BRICK

Amer. Chimney Corp., N. Y.
Alphons Custodia Chimney Const. Co., N. Y.
Continental Chimney Co. of Chi., Chicago
Heine Chimney Co., Chicago
H. R. Heinicks, Inc., Indianapolis, Ind.
M. W. Kellogg & Co., N. Y.
Rust Eng. Co., Pittsburgh, Pa.

CHIMNEYS, STEEL (See Stacks, Steel)

CHLORINATORS

*Wallace & Tiernan Co., Inc., Newark, N. J.

CHLORINE, LIQUID

(See Liquid Chlorine)

CHUTES, CONCRETE

*Insley Mfg. Co., Indianapolis, Ind.
*Lakewood Eng. Co., Cleveland, O.
*Ransome Const. Mch. Co., Dannelien, N. J.

CLIPS, WIRE ROPE

Amer. Hoist & Derrick Co., St. Paul, Minn.
Fischer & Hayes Rope & Steel Co., Chicago
Thos. Laughlin Co., Portland, Me.
Marion Malleable Ir. Wks., Marion, Ind.
O. M. Moeckbe & Co., Cincinnati, O.
John A. Roebeling Sons Co., Trenton, N. J.
Upson-Walton Co., Cleveland, O.

CLUTCHES

*Twin Disc Clutch Co., Racine, Wis.
*Waukesha Motor Co., Waukesha, Wis.

COAL AND ORE CONVEYING MCHY.

*Barber-Greene Co., Aurora, Ill.
*Good Roads Machy. Co., Kennett Sq., Pa.
*Chicago Automatic Conv. Co., Chicago
*Fairfield Eng. Co., Marion, O.
*Geo. Hais Mfg. Co., N. Y.
*Mead-Morrison Mfg. Co., E. Boston.
C. O. Bartlett & Snow Co., Cleveland, O.
Brown Hoisting Mch. Co., Cleveland, O.
Chain Belt Co., Milwaukee, Wis.
Gifford-Wood Co., Hudson, N. Y.
C. W. Hunt Co., Inc., W. New Brighton, N. Y.
Jeffrey Mfg. Co., Columbus, O.
Lidgerwood Mfg. Co., N. Y.
Link-Belt Co., Chicago.
Portable Machinery Co., Passaic, N. J.
Robins Conv. Belt Co., N. Y.
Webster Mfg. Co., Chicago.
Weller Mfg. Co., Chicago.

COCKS, CURE AND CORPORATION

*Union Wtr. Mtr. Co., Worcester, Mass.
Chapman Valve Mfg. Co., Indian Orchard, Mass.
Glauber Brass Mfg. Co., Cleveland, O.
Haydenville Co., Haydenville, Mass.
Hays Mfg. Co., Erie, Pa.
Mueller Co., Decatur, Ill.

COLLAPSIBLE HORSES

*Taylor Collapsible Horse Co., Chicago.

COLUMN CLAMPS

*Insley Mfg. Co., Indianapolis, Ind.
*M. & M. Wire Clamp Co., Minneapolis
The O. D. G. Co., Orem, Utah
Victor L. Phillips Co., Kansas City, Mo.
Sterling Wheelbarrow Co., Milwaukee.
Symons Clamp & Mfg. Co., Chicago.
Universal Form Clamp Co., Chicago.

COMPRESSORS, AIR (See Air Compressors)

CONCRETE BLOCK MACHINES (See Cement Block Machines)

CONCRETE FLOOR HARDENER

Anti-Hydro Waterproofing Co., Newark, N. J.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*



Why some contractors make money

Every day you hear of contractors losing money because they are unable to finish their jobs on time.

Contractors who "know the game" use dependable equipment which does not break down under the strain of constant service. They know that a crane laid up for repairs does not contribute much to their pocket book.

If the crane is out of service, it means more demurrage charges, idling trucks

waiting for loads, a mixer waiting for a batch and a whole road gang stalling around for something to do.

Ask any contractor why he uses ORTON Cranes. Successful contractors all over the country have been using them for twenty years.

Your next road job will be a profitable one if you use an ORTON Model "T" Crane—we build it principally for contractors.

CATALOGS SENT ON REQUEST

ORTON CRANE & SHOVEL CO., *FORMERLY* ORTON & STEINBRENNER CO

608 So. Dearborn St.

ORTON
CRANE & SHOVEL CO.

Chicago, Illinois

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Where to Purchase

9

General Chemical Co., N. Y.
General Firepr. Co., Youngstown, O.
Graniter Corp., N. Y.
A. C. Horn Co., L. I. City, N. Y.
Master Builders Co., Cleveland, O.
L. Sonneborn Sons, Inc., N. Y.
Truscon Laboratories, Detroit.

CONCRETE HEATERS

*Aerol Burner Co., Union Hill, N. J.
*Chausse Oil Burner Co., Elkhart, Ind.
*Hauck Mfg. Co., Brooklyn, N. Y.
*Alex. Milburn Co., Baltimore, Md.

CONCRETE MIXERS

*Amer. Cem. Mch. Co., Inc., Keokuk, Ia.
*Atlas Eng. Co., Milwaukee, Wis.
*Construction Mch. Co., Waterloo, Ia.
*Jaeger Mach. Co., Columbus, O.
*Kiel Mach. Co., Milwaukee
*Koehring Co., Milwaukee, Wis.
*Kwik-Mix Con. Mixer Co., Port Wash-
ington, Wis.
*Lakewood Eng. Co., Cleveland, O.
*Lansing Co., Lansing, Mich.
*Raber & Lang Mfg. Co., Kendallville,
Ind.
*Ransome Con. Mch. Co., Dunellen, N.J.
*Schraun, Inc., West Chester, Pa.
*T. L. Smith Co., Milwaukee, Wis.
*Standard Scale & Supply Co., Pittsburgh
Badger Con. Mixer Co., Milwaukee
Chain Belt Co., Milwaukee
B. M. Cropp Co., Chicago
The Foote Co., Nunda, N. Y.
J. B. Foote Fdry. Co., Fredericktown, O.
Gray Iron Fdry Co., Reading, Pa.
Judy Mfg. Co., Centerville, Ia.
Knickerbocker Co., Jackson, Mich.
Leach Co., Oshkosh, Wis.
Marsh-Capron Co., Chicago
Milwaukee Conc. Mixer Co., Milwaukee
Rommel Mfg. Co., Kewaskum, Wis.
Republic Ir. Wks. Tecumseh, Mich.

CONCRETE PILING (See Piling)

CONCRETE PIPE (See Pipe, Concrete)

CONCRETE REINFORCEMENT

*Truscon Steel Co., Youngstown, O.
American Steel & Wire Co., Chicago.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Concrete Steel Co., N. Y.
Consolidated Exp. Metal Co., Braddock,
Pa.
Electric Welding Co., Pittsburgh, Pa.
Ft. Pitt Bridge Wks., Pittsburgh, Pa.
General Fireproofing Co., Youngstown, O.
Inland Steel Co., Chicago.
Kaiman Steel Co., Chicago.
Laclede Steel Co., St. Louis, Mo.
National Steel Fabric Co., Pittsburgh.
J. T. Ryerson & Son, Chicago.
Wickwire-Spencer Steel Co., N. Y.
Youngstown Pressed Steel Co., War-
ren, O.
Youngstown Sheet & Tube Co., Youngs-
town, O.

CONCRETE ROAD FINISHERS

*Heitzel Stl. Form & Iron Co., Warren, O.
*Lakewood Eng. Co., Cleveland, O.
Dunn Road Mach. Co., Conneaut, O.
A. W. French & Co., Chicago

CONCRETE SURFACING MACHINES

*Concrete Surfacing Machy. Corp., Cin-
cinnati, O.
W. H. Keller, Inc., Grand Haven, Mich.

CONCRETE TOOLS

*The Dallett Co., Philadelphia.

CONDENSERS

*Ingersoll-Rand Co., N. Y.
*Inia-Chalmers Mfg. Co., Milwaukee.
Dean Bros. Co., Indianapolis, Ind.
Westinghouse Elec. & Mfg. Co., E.
Pittsburgh, Pa.

Wheeler Cond. & Eng. Co., Carteret, N.J.
Worthington Pump & Machy Corp., N.Y.

CONDUIT RODS

F. Bissell Co., Toledo, O.
Turbine Sewer Mch. Co., Milwaukee.
Waldo Bros. & Bond Co., Boston.

CONDUITS, UNDERGROUND

Amer. Vitr. Products Co., Akron, O.
Johns-Manville Inc., N. Y.
National Fireproofing Co., N. Y.
Ric-wil Co., Cleveland.

CONTRACTORS' EQUIPMENT DEAL- ERS (See pages 167 to 190)

CONVEYORS, BELT

*Austin-Western Ed. Mch. Co., Chicago
*Barber-Greene Co., Aurora, Ill.
*Chicago Automatic Conv. Co., Chicago
*Gallion Ir. Wks. & Mfg. Co., Gallion, O.
*Good Rds. Machy. Co., Kennett Sq., Pa.
*Geo. Haisis Mfg. Co., N. Y.
*Russell Grader Mfg. Co., Minneapolis.
Brown Hoisting Machy. Co., Cleveland
Chain Belt Co., Milwaukee
Gifford Wood Co., Hudson, N. Y.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Chicago.
Samuel Olson & Co., Chicago.
Portable Machy Co., Passaic, N. J.
Robins Conv. Belt Co., N. Y.
Standard Conv. Co., No. St. Paul, Minn.
Webster Mfg. Co., Chicago.
Weller Mfg. Co., Chicago.

CONVEYORS, BUCKET

*Atlas Eng. Co., Milwaukee.
*Chicago Automatic Conv. Co., Chicago
*Fairfield Eng. Co., Marion, O.
*Good Rds. Machy. Co., Kennett Sq., Pa.
*Geo. Haisis Mfg. Co., N. Y.
*Mead-Morrison Mfg. Co., E. Boston.
*Russell Grader Mfg. Co., Minneapolis.
F. O. Bartlett & Snow Co., Cleveland, O.
Brown Hoisting Machy. Co., Cleveland, O.
H. W. Caldwell & Son, Chicago.
Chain Belt Co., Milwaukee.
Gifford Wood Co., Hudson, N. Y.
Godfrey Conv. Co., Elkhart, Ind.
Guarantee Constn. Co., N. Y.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Chicago.
Samuel Olson & Co., Chicago.
Republic Rubber Co., Youngstown, O.
Robins Conv. Belt Co., N. Y.
Stephens Adamson Mfg. Co., Aurora, Ill.
Webster Mfg. Co., Chicago.
Weller Mfg. Co., Chicago.

CONVEYORS, GRAVITY

Lamson Co., Syracuse, N. Y.
Logan Co., Louisville, Ky.
Mathews Gravity Carrier Co., Elwood
City, Pa.
Standard Conv. Co., No. St. Paul, Minn.

COUPLINGS, HOSE

*Ingersoll-Rand Co., N. Y.
Cleveland Pneum. Tool Co., Cleveland, O.
Gilman Mfg. Co., East Boston, Mass.
W. H. Keller, Inc., Grand Haven, Mich.

CRANES, LOCOMOTIVE

*Bay City Dredge Wks., Bay City, Mich.
*Byers Machine Co., Ravenna, O.
*Erie Steam Shovel Co., Erie, Pa.
*Harnischfeger Corp., Milwaukee.
*Koehring Co., Milwaukee.
*Marion Steam Shovel Co., Marion, O.
*Orton Crane & Shovel Co., St. Paul, Minn.
Brown Hoisting Machy Co., Cleveland.
Browning Crane Co., Cleveland, O.
Bucyrus Co., So. Milwaukee, Wis.
Davenport Loe. Wks., Davenport, Ia.
Hanna Eng. Works, Chicago.
Industrial Wks., Bay City, Mich.
Link-Belt Co., Chicago.
Loc. Crane Co. of Amer., Champaign, Ill.
McMyler Interstate Co., Cleveland, O.
Northwest Eng. Works, Chicago.
Ohio Loe. Crane Co., Bucyrus, O.

Thew Shovel Co., Lorain, O.
U. S. Crane Co., Chicago.

CRANES, OVERHEAD TRAVELING

*Curtis Pneum. Mach. Co., St. Louis
*Harnischfeger Corp., Milwaukee.
Alliance Mach. Co., Alliance, O.
Chesapeake Iron Wks., Baltimore, Md.
Chisholm-Moore Mfg. Co., Cleveland, O.
Milwaukee Elec. Crane Co., Milwaukee.
Morgan Eng. Co., Alliance, O.
Northern Eng. Wks., Detroit, Mich.
Shaw Crane Wks., Muskegon, Mich.
Shepard Elec. Cr. & Hst. Co., Montour
Falls, N. Y.
Toledo Crane Co., Bucyrus, O.
Whiting Fdry. & Equip. Co., Harvey, Ill.

CRANES, TRUCK

*Byers Machine Co., Ravenna, O.
*Harnischfeger Corp., Milwaukee.
*Orton Crane & Shovel Co., Chicago
Bay City Fdry. & Mach. Co., Bay City,
Mich.
Universal Crane Co., Cleveland.

CRANES, WRECKING

Bucyrus Co., So. Milwaukee, Wis.
Industrial Wks., Bay City, Mich.

CRAWLER ATTACHMENTS

Geo. Haisis Mfg. Co., New York

CRESOTED BLOCKS, TIMBER, ETC.

Amer. Creos. Co., Inc., Louisville, Ky.
Amer. Creos. Wks. Inc., N. Orleans, La.
Carter Bloxonend Flooring Co., K. City,
Mo.

Colonial Cre. Co., Inc., Louisville, Ky.
Compressed Wood Preserving Co., Cin-
cinnati, O.

Creos. Materials Co., N. Orleans, La.
Georgia Creos. Co., Louisville, Ky.
Jennison-Wright Co., Toledo, O.
Midland Creos. Co., Granite City, Ill.
Pensacola Creosoting Co., Pensacola, Fla.
Republic Creos. Co., Indianapolis, Ind.
Southern Wood Pres. Co., Atlanta, Ga.
Wyckoff Pipe & Creos. Co., N. Y.

CRESOTING AND CRESOTING OILS

*Barrett Co., N. Y.
Amer. Creos. Wks. Inc., N. Orleans, La.
Amer. Tar Prod. Co., Pittsburgh, Pa.
Jennison-Wright Co., Toledo, O.
Southern Creos. Co., Ltd., Sildell, La.
Southern Pavg. Const. Co., Chattanooga.
Wyckoff Pipe & Creos. Co., N. Y.

CRUSHERS, HEAVY DUTY

Allia-Chalmers Mfg. Co., Milwaukee.
O. G. Buchanan Co., N. Y.
Traylor Eng. & Mfg. Co., Allentown, Pa.

CRUSHERS, ROCK

*Acme Ed. Machy. Co., Frankfort, N. Y.
*Austin-Western Ed. Mach. Co., Chicago
*Gallion Iron Wks. & Mfg. Co., Gallion, O.
*Good Rds. Machy. Co., Kennett Sq., Pa.
*Russell Grader Mfg. Co., Minneapolis.
*Smith Eng. Wks., Milwaukee.
*Universal Ed Machy Co., Kingston, N.Y.
Morgan Eng. Co., Alliance, O.
New Holland Mach. Co., New Holland, Pa.
Surtlevant Mill Co., Boston.
Universal Crusher Co., Cedar Rapids, Ia.

CULVERTS, CAST IRON

*Gallion Ir. Wks. & Mfg. Co., Gallion, O.
*U. S. C. I. Pipe & Fdry. Co., Burling-
ton, N. J.

Amer. C. I. Pipe Co., Birmingham, Ala.
Gilbert Mfg. Co., Aberdeen, S. D.
R. D. Wood & Co., Philadelphia

CULVERTS, CORRUGATED METAL

*Austin-Western Ed. Mach. Co., Chicago
*Gallion Iron Wks. & Mfg. Co., Gallion, O.
*Good Rds. Mach. Co., Kennett Sq., Pa.
*Newport Culvert Co., Newport, Ky.
Bark River Bridge & Culv. Co., Bark
River, Mich.
Boardman Co., Okla. City, Okla.
Burnham Mfg. Co., Woods Cross, Utah.
Calif. Corr. Culv. Co., W. Berkeley, Cal.
Canada Ingot Ir. Co., Ltd., Guelph, Ont.

Indicates that the manufacturer carries an advertisement. See index facing inside back cover.



Wheel Equipment *is the* *important thing!*

Before condemning any of the fine pieces of contractors' equipment on the market, look to the basis of traction—the wheels! Your scraper or grader is useless if the wheels of your tractor skid, slip or spin. Grid-Iron-Grip Wheels embody the crawler principle in operation — without reduction in speed, and at a much

lower cost. The grips come down flat, lay a track for the wheel, then clean themselves while coming around. Solve your traction problems today! Your Fordson Dealer or International Branch can arrange for a demonstration. Meanwhile write The Tractor Grip Wheel Company, 2405 Waterworks Drive, Toledo, Ohio, for information.

Grid-Iron-Grip Wheels *for Tractors*



When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Where to Purchase

11

- Canton Culv. & Silo Co.,** Canton, O.
Coast Culv. & Flume Co., Portland, Ore.
Corr. Culv. Co., Moberly, Mo.
Dixie Culv. & Metal Co., Atlanta, Ga.
Dixie Culv. Mfg. Co., Little Rock, Ark.
Fila Metal Prod. Co., Jacksonville, Fla.
Gilbert Mfg. Co., Aberdeen, S. D.
R. Hardesty Mfg. Co., Denver, Colo.
Highway Prod. & Mfg. Co., Elmira, N.Y.
Ind. Corr. Culv. Co., Mason City, Ia.
Iowa Pure Ir. Co., Des Moines, Ia.
Klauser Mfg. Co., Dubuque, Ia.
Lyle Culv. & Rd. Equip. Co., Minneapolis, Minn.
Md. Culv. & Metal Co., Baltimore.
N. E. Metal Culv. Co., Palmer, Mass.
Nebraska Culv. & Mfg. Co., Wahoo, Neb.
North East Metal Culv. Co., Nashua, N.H.
Northfield Ir. Co., Northfield, Minn.
Northw't'n Sheet & Ir. Wks., Wapeton, N. D.
Ohio Corr. Culv. Co., Middletown, O.
W. Q. O'Neill Co., Crawfordsville, Ind.
Road Supply & Metal Co., Topeka, Kan.
Sioux Falls Metal Culv. Co., Sioux Falls, S. D.
So. Metal Culv. Co., Salisbury, N. C.
Spokane Culv. & Tank Co., Spokane, Tenn.
Tenn. Metal Culv. Co., Nashville.
U. S. Br. & Culv. Co., Bay City, Mich.
Ya. Metal Mfg. Co., Roanoke, Va.
Western Metal Mfg. Co., Houston, Tex.
Wheeling Corr. Co., Wheeling, W. Va.
Wyatt Metal & Blr. Wks., Dallas, Tex.
- CULVERT FORMS**
Concrete Form Co., Inc., Syracuse, N.Y.
Northfield Iron Co., Northfield, Minn.
- CURB BOXES**
Casey-Hedges Co., Chattanooga, Tenn.
H. W. Clark Co., Mattoon, Ill.
J. B. Clow & Sons, Chicago.
Madison Fdry. Co., Cleveland, O.
Mueller Co., Decatur, Ill.
- CURB GUARDS, STEEL**
***W. S. Godwin Co.,** Baltimore.
- CURB, STEEL PROTECTED**
***Trascon Steel Co.,** Youngstown, O.
Concrete Steel Co., N. Y.
- CURING OF CONCRETE**
***Dow Chemical Co.,** Midland, Mich.
***Solvay Process Co.,** N. Y.
- CUTTERS, PIPE, HAND**
Armstrong Mfg. Co., Bridgeport, Ct.
Barnes Tool Co., New Haven, Ct.
Erie Tool Works, Erie, Pa.
Greenfield Tap & Die Corp., Greenfield, Mass.
Oswego Tool Co., Oswego, N. Y.
Reed Mfg. Co., Erie, Pa.
Walworth Mfg. Co., Boston.
- CUTTERS, ROD AND WIRE**
***Koehring Co.,** Milwaukee, Wis.
Buffalo Forge Co., Buffalo, N. Y.
Carolus Mfg. Co., Sterling, Ill.
C. D. Edwards Mfg. Co., Albert Lea, Minn.
Helwig Mfg. Co., St. Paul, Minn.
Worthington Pump & Mch. Corp., N.Y.
- CUTTING EDGES**
***Russell Grader Mfg. Co.,** Minneapolis
J. D. Adams & Co., Indianapolis, Ind.
Shunk Mfg. Co., Bucyrus, O.
- CUTTING AND WELDING APPARATUS**
***Alex. Milburn Co.,** Baltimore.
MacLeod Co., Cincinnati, O.
- DERRICKS, GUY AND STIFF-LEG**
***Clyde Ir. Wks. Sales Co.,** Duluth, Minn.
***Dobbie Fdry. & Mach. Co.,** Niagara Falls, N. Y.
***S. Flory Mfg. Co.,** Bangor, Pa.
***Insley Mfg. Co.,** Indianapolis, Ind.
- *Saagen Derrick Co.,** Chicago.
***Street Bros. Mach. Wks.,** Chattanooga
***Universal Hstg. Machy Corp.,** Buffalo.
Amer. Hat. & Derrick Co., St. Paul, Minn.
Federal Br. & Struc. Co., Waukesha, Wis.
John T. Horton Co., N. Y.
Lakeside Bridge & Steel Co., N. Milwaukee, Wis.
Lidgerwood Mfg. Co., N. Y.
National Hstg. Eng. Co., Harrison, N.J.
Superior Iron Wks., Superior, Wis.
- DERRICKS, PIPE LAYING**
***Dobbie Fdry. & Mach. Co.,** Niagara Falls
***Street Bros. Mach. Wks.,** Chattanooga
Lidgerwood Mfg. Co., N. Y.
Mueller Co., Decatur, Ill.
Squier-Rix Co., Milwaukee.
- DERRICKS, REVOLVING**
***Clyde Iron Wks. Sales Co.,** Duluth, Minn.
***Dobbie Fdry. & Mach. Co.,** Niagara Falls
***Street Bros. Mach. Wks.,** Chattanooga
Lidgerwood Mfg. Co., N. Y.
- DERRICKS, STEEL**
***Clyde Ir. Wks. Sales Co.,** Duluth, Minn.
***Dobbie Fdry. & Mach. Co.,** Niagara Falls
***Insley Mfg. Co.,** Indianapolis, Ind.
***Street Bros. Mach. Wks.,** Chattanooga
Amer. Hat. & Derrick Co., St. Paul
Hayward Co., N. Y.
Lidgerwood Mfg. Co., N. Y.
Taylor Port. St. Derrick Co., Chicago.
- DERRICKS, STEEL PORTABLE**
***Clyde Ir. Wks. Sales Co.,** Duluth, Minn.
***Dobbie Fdry. & Mach. Co.,** Niagara Falls
***Street Bros. Mach. Wks.,** Chattanooga
Amer. Hoist & Derrick Co., St. Paul
Lidgerwood Mfg. Co., N. Y.
- DERRICKS, TRAVELING**
***Bay City Dredge Wks.,** Bay City, Mich.
***Clyde Ir. Wks. Sales Co.,** Duluth, Minn.
***Dobbie Fdry. & Mach. Co.,** Niagara Falls
***Orton Crane & Shovel Co.,** Chicago
***Street Bros. Mach. Wks.,** Chattanooga
Amer. Hoist & Derrick Co., St. Paul
Austin Machy Corp., Muskegon, Mich.
Hayward Co., N. Y.
Nat'l Hstg. Eng. Co., Harrison, N. J.
- DERRICK FITTINGS**
***S. Flory Mfg. Co.,** Bangor, Pa.
***Street Bros. Mach. Wks.,** Chattanooga
Lidgerwood Mfg. Co., N. Y.
- DIESEL ENGINES (See Engines, Oil)**
- DISTRIBUTORS, TAR AND ASPHALT**
Kinney Mfg. Co., Boston
- DISTRIBUTING PLANTS, CONCRETE**
***Lakewood Eng. Co.,** Cleveland.
***Insley Mfg. Co.,** Indianapolis, Ind.
***Ransome Conc. Mch. Co.,** Dunellen, N.J.
Archer Iron Works, Chicago.
- DITCHING MACHINES (See Excavators)**
- DIVIDING PLATES (ROAD)**
***W. S. Godwin Co.,** Baltimore
- DOORS AND SHUTTERS, STEEL ROLLING**
Cornell Iron Wks., B'klyn, N. Y.
Kinnear Mfg. Co., Columbus, O.
Variety Fire Door Co., Chicago.
J. G. Wilson Corp., N. Y.
- DRAFTING MACHINES**
Univ. Drafting Mach. Co., Cleveland, O.
- DREDGES**
***Bay City Dredge Wks.,** Bay City, Mich.
***Erie Steam Shovel Co.,** Erie, Pa.
***Marion Steam Shovel Co.,** Marion, O.
***Orton Crane & Shovel Co.,** Chicago
***Street Bros. Mach. Wks.,** Chattanooga
Amer. Steel Dredge Co., Ft. Wayne, Ind.
Street Bros. Mach. Wks., Chattanooga
Bucyrus Co., So. Milwaukee, Wis.
Ellicott Machy Corp., Baltimore.
Hayward Co., N. Y.
Lidgerwood Mfg. Co., N. Y.
- Osgood Co.,** Marion, O.
Stockton Iron Wks., Stockton, Cal.
Superior Iron Wks., Superior, Wis.
- DREDGES, DIPPER**
***Bay City Dredge Wks.,** Bay City, Mich.
***Marion Steam Shovel Co.,** Marion, O.
Amer. Steel Dredge Co., Ft. Wayne, Ind.
Austin Machy Corp., Muskegon, Mich.
Bucyrus Co., So. Milwaukee, Wis.
Osgood Co., Marion, O.
- DREDGES, HYDRAULIC**
***Marion Steam Shovel Co.,** Marion, O.
Bucyrus Co., South Milwaukee, Wis.
Ellicott Mach. Corp., Baltimore.
Morris Mach. Wks., Baldwinsville, N.Y.
- DREDGING MACHINERY**
***S. Flory Mfg. Co.,** Bangor, Pa.
***Street Bros. Mach. Wks.,** Chattanooga
Lidgerwood Mfg. Co., N. Y.
- DREDGING PUMPS AND ACCESSORIES**
***Ingersoll-Rand Co.,** New York
Erie Pump & Engine Wks., Medina, N.Y.
- DRILLS, CORE**
***Ingersoll-Rand Co.,** N. Y.
***McKiernan-Terry Drill Co.,** N. Y.
***Sullivan Machy. Co.,** Chicago.
Dobbins Core Drill Co., Inc., N. Y.
Standard Diamond Drill Co., Chicago.
- DRILLS, ROCK**
***Dallett Co.,** Philadelphia.
***Denver Rock Drill Mfg. Co.,** Denver.
***Ingersoll-Rand Co.,** N. Y.
***McKiernan-Terry Drill Co.,** N. Y.
***Sullivan Machy. Co.,** Chicago.
Chicago Pneum. Tool Co., N. Y.
Cleveland Pneum. Tool Co., Cleveland, O.
Cleveland Rock Drill Co., Cleveland, O.
Gilman Mfg. Co., E. Boston.
Helwig Mfg. Co., St. Paul, Minn.
Independent Pneum. Tool Co., Chicago.
W. H. Koller Inc., Grand Haven, Mich.
Wood Drill Wks., Paterson, N. J.
- DRILLS FOR WELLS AND BLAST HOLES (See Well Drilling Machy)**
- DRUMS, HOLDING**
***Blaw-Knox Co.,** Pittsburgh, Pa.
***Clyde Ir. Wks. Sales Co.,** Duluth, Minn.
***Dobbie Fdry. & Mch. Co.,** Niagara Falls.
***Street Bros. Mach. Wks.,** Chattanooga
Hayward Co., N. Y.
Monaghan Machine Co., Chicago.
- DRYERS, ASPHALT AND CEMENT**
Allis-Chalmers Mfg. Co., Milwaukee.
Amer. Blower Co., Detroit, Mich.
Amer. Process Co., N. Y.
Atlas Dryer Co., Cleveland, O.
C. O. Bartlett & Snow Co., Cleveland, O.
F. D. Cummer & Son Co., Cleveland, O.
Mosher Mfg. Co., Chicago
Ruggles-Coles Eng. Co., N. Y.
- DRYERS, SAND AND GRAVEL**
***Aeroll Burner Co.,** Union Hill, N. J.
***Chausse Oil Burner Co.,** Elkhart, Ind.
***Littleford Bros.,** Cincinnati, O.
***Alex. Milburn Co.,** Baltimore, Md.
C. O. Bartlett & Snow Co., Cleveland, O.
Chase & Lyman, Boston.
Mosher Mfg. Co., Chicago
- DUMP BODIES FOR MOTOR TRUCKS**
***Anthony Co.,** Streator, Ill.
***Easton Car & Constn Co.,** Easton, Pa.
***Hell Co.,** Milwaukee.
***Highway Trailer Co.,** Edgerton, Wis.
***Insley Mfg. Co.,** Indianapolis, Ind.
***Littleford Bros.,** Cincinnati, O.
***Mack Trucks, Inc.,** N. Y.
***Marion Steel Body Co.,** Marion, O.
***N. Y. Central Ir. Wks.,** Hagerstown, Md.
***Stewart Iron Wks. Co.,** Cincinnati.
***Wood Hydr. Hoist & Body Co.,** Detroit
Am. Truck & Body Co., Martinsville, Va.
Archer Iron Wks., Chicago.
Columbia Body Corp., Columbia, Pa.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*

UNION

in Florida

Size 1 UNION Hammer
owned by R. H. H. Blackwell,
Contracting Engineer of Ella-
ville, Fla., driving 18" square
precast concrete piles for Su-
wanee River Bridge.

We quote from Mr. Black-
well's letter:

"Piles were driven from 20
to 30 feet penetration into
sand, clay and *soft rock*. In
spite of the fact that the
piles penetrated as far as 5
feet into the soft rock, the
No. 1 UNION drove them
without any difficulty and
without damaging or crack-
ing a single pile. The ham-
mer worked without a
single minute's delay. In
fact, it was not touched
from the time it was put in
the leads till the work was
completed."

UNION PILE HAMMERS
DRIVE
AND
PULL

The complete line of UNION Equipment for construction work also includes Unionlock Concrete Buckets, Union Grout Mixers and Ejectors, Cableway Skips, Tunnel Shields, Air Locks, etc.

UNION IRON WORKS

Builders of Double Acting Pile Hammers Since 1906

NEWARK and MONROE STS.

HOBOKEN, NEW JERSEY

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

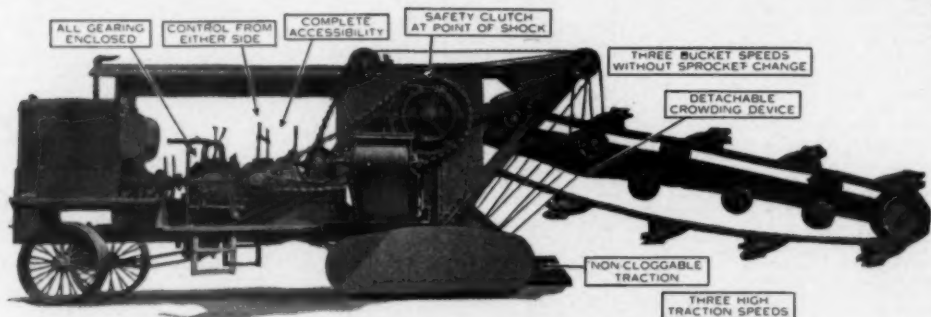
Where to Purchase

13

- Columbian St. Tank Co., Kansas City.
Detroit Trailer & Mach. Co., Detroit.
Dittler Mfg. Co., Gallon, O.
Gallon All Steel Body Co., Gallon, O.
Griscom-Russell Co., N. Y.
Herr Dump Car Mfg. Co., Coatesville, Pa.
Hughes-Keenan Co., Mansfield, O.
The Hug Co., Highland, Ill.
Jennings Aut. Dump Body, Roanoke, Va.
Lee Trailer & Body Co., Chicago.
Mandt Body Co., Keokuk, Ia.
Pechstein Iron Wks., Keokuk, Ia.
Superior Body Corp'n., Marion, Ind.
Van Dorn Iron Wks., Cleveland.
- DUMP CARTS AND WAGONS, HORSE**
*Acme Ed. Machy. Co., Frankfort, N. Y.
*Austin-Western Ed. Machy. Co., Chicago.
*Eagle Wagon Wks., Auburn, N. Y.
*La Plant-Cheate Mfg. Co., Cedar Rapids, Ia.
*Russell Grader Mfg. Co., Minneapolis.
*Watson Truck Corp., Ganastota, N. Y.
*Acme Wagon Co., Emigsville, Pa.
Austin Mfg. Co., Chicago.
Bain Wagon Co., Kenosha, Wis.
Columbia Body Corp., Columbia, Pa.
Gilbert Mfg. Co., Aberdeen, S. D.
Hagy Wagon Co., Abingdon, Va.
G. H. Heilsbog & Bro., Jeffersonville, Ind.
Little Red Wagon Co., Omaha, Neb.
Stockland Rd. Machy. Co., Minneapolis.
Streich Bros., Oshkosh, Wis.
Thornhill Wagon Co., Lynchburg, Va.
Western Wheeled Scraper Co., Aurora, Ill.
- DUST LAYING (CALCIUM CHLORIDE)**
*Dew Chemical Co., Midland, Mich.
*Solvay Process Co., N. Y.
Carbondale Calcium Co., Carbondale, Pa.
- DYNAMITE (See Explosives)**
- EJECTORS, SEWAGE (See Sewage Ejectors)**
- ELECTRIC GENERATORS AND MOTORS**
Louis Allis Co., Milwaukee.
Allis-Chalmers Mfg. Co., Milwaukee.
Crocker-Wheeler Co., Ampere, N. J.
Fairbanks, Morse & Co., Chicago.
General Elec. Co., Schenectady, N. Y.
Ideal Elec. & Mfg. Co., Mansfield, O.
Lincoln Elec. Co., Cleveland, O.
Robbins & Myers Co., Springfield, O.
Triumph Elec. Co., Cincinnati, O.
Wagner Elec. Mfg. Co., St. Louis.
Western Elec. Co., N. Y.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
- ELECTRIC LAMPS**
General Elec. Co., Schenectady, N. Y.
Westinghouse Lamp Co., N. Y.
- ELECTRIC LIGHTING PLANTS**
*Climax Eng. Co., Clinton, Ia.
Allis-Chalmers Mfg. Co., Milwaukee.
Cushman Motor Wks., Lincoln, Neb.
Fairbanks, Morse & Co., Chicago.
General Elec. Co., Schenectady, N. Y.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
Western Elec. Co., N. Y.
- ELECTRIC TRANSFORMERS**
Allis-Chalmers Mfg. Co., Milwaukee.
General Elec. Co., Schenectady, N. Y.
Kuhlman Elec. Co., Bay City, Mich.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
- ELECTRIC WIRES (See Wire)**
- ELEVATORS, BUCKET**
*Atlas Eng. Co., Milwaukee.
*Austin-Western Ed. Machy. Co., Chicago.
*Fairfield Eng. Co., Marion, O.
*Good Eds. Machy. Co., Kennett Sq., Pa.
*Geo. Hains Mfg. Co., N. Y.
*Littisford Bros., Cincinnati.
*Russell Grader Mfg. Co., Minneapolis.
- ELEVATORS, PASSENGER, FREIGHT, ETC.**
Am. Elev. & Mach. Co., Louisville, Ky.
Atlantic Elev. Co., Inc., Philadelphia.
Bay State Elev. Co., Springfield, Mass.
Haughton Elev. & Mach. Co., Toledo, O.
Kaesner & Hecht Co., Chicago.
Llewellyn Ir. Wks., Los Angeles, Cal.
Montgomery Elev. Co., Moline, Ill.
Otis Elevator Co., N. Y.
O. Ridgway & Son Co., Coatesville, Pa.
A. B. See Elec. Elev. Co., N. Y.
Spaidel Elev. Corp., Reading, Pa.
Warner Elev. Mfg. Co., Cincinnati.
Warsaw Elev. Co., Warsaw, N. Y.
- ENGINES, GAS AND GASOLINE**
*Alamo Eng. Co., Hillsdale, Mich.
*Caterpillar Tractor Co., San Leandro, Cal.
*Climax Eng. Co., Clinton, Ia.
*Continental Motors Corp., Detroit.
*Domestic Eng. & Pump Co., Shippensburg, Pa.
*Hercules Corp., Evansville, Ind.
*Hercules Motors Corp., Canton, O.
*Hinckley Motors, Inc., Detroit.
*Ingersoll-Rand Co., New York.
*John Lauson Mfg. Co., New Holstein, Wis.
*Le Roi Co., Milwaukee.
*Novo Engine Co., Lansing, Mich.
*Stover Mfg. & Eng. Co., Freeport, Ill.
*Waukesha Motor Co., Waukesha, Wis.
Allis-Chalmers Mfg. Co., Milwaukee.
Beaver Mfg. Co., Milwaukee, Wis.
Buda Co., Harvey, Ill.
C. H. & E. Mfg. Co., Milwaukee.
Charter Gas Eng. Co., Sterling, Ill.
Chicago Pneum. Tool Co., N. Y.
Cook Motor Co., Delaware, O.
Cushman Motor Wks., Lincoln, Neb.
Evinrude Motor Co., Milwaukee.
Fairbanks, Morse & Co., Chicago.
Foss Gas Eng. Co., Springfield, O.
Fuller & Johnson Mfg. Co., Madison, Wis.
Gade Bros. Mfg. Co., Iowa Falls, Ia.
Sanderson-Cyclone Drill Co., Orrville, O.
Sterling Eng. Co., Buffalo, N. Y.
Universal Motor Co., Oshkosh, Wis.
Weber Engine Co., Kansas City, Mo.
Wisconsin Motor Mfg. Co., Milwaukee.
Worthington Pump & Mch. Corp., N.Y.
- ENGINES, HOISTING (See Hoists)**
- ENGINES, KEROSENE**
*Alamo Eng. Co., Hillsdale, Mich.
*Climax Eng. Co., Clinton, Ia.
*Stover Mfg. & Eng. Co., Freeport, Ill.
*Waukesha Motor Co., Waukesha, Wis.
- ENGINES, OIL DIESEL**
*Haddfield-Pensfield Steel Co., Bucyrus, O.
Allis-Chalmers Mfg. Co., Milwaukee.
Busch-Sulzer Bros.-Diesel Eng. Co., St. Louis.
Fulton Iron Wks. Co., St. Louis.
McIntosh & Seymour Corp., Auburn, N.Y.
Nordberg Mfg. Co., Milwaukee.
St. Mary's Oil Eng. Co., St. Charles, Mo.
Western Machy. Co., Los Angeles, Cal.
- SEMI-DIESEL**
*Ingersoll-Rand Co., N. Y.
*Stover Mfg. & Eng. Co., Freeport, Ill.
Anderson Fdry. & Mach. Co., Anderson, Ind.
- Bessemer Gas Eng. Co., Grove City, Pa.
Buckeye Machinery Co., Lima, O.
Charter Gas Eng. Co., Sterling, Ill.
Chicago Pneum. Tool Co., N. Y.
De La Vergne Mach. Co., N. Y.
Fairbanks, Morse & Co., Chicago.
Foss Gas Eng. Co., Springfield, O.
Lombard Gov. Co., Ashland, Mass.
Muncie Oil Eng. Co., Muncie, Ind.
New London Ship & Eng. Co., Groton, Ct.
Nordberg Mfg. Co., Milwaukee.
Taylor Mach. Co., Cleveland, O.
Weber Eng. Co., Kansas City, Mo.
Worthington Pump & Mch. Corp., N.Y.
- ENGINES, PUMPING**
*Climax Eng. Co., Clinton, Ia.
*Stover Mfg. & Eng. Co., Freeport, Ill.
*Waukesha Motor Co., Waukesha, Wis.
Allis-Chalmers Mfg. Co., Milwaukee.
Heaven, Owens, Rentschler Co., Hamilton, O.
Murray Iron Wks., Burlington, Ia.
Nordberg Mfg. Co., Milwaukee.
Worthington Pump & Mch. Corp., N.Y.
- ENGINES, STEAM**
*Ingersoll-Rand Co., New York.
Allis-Chalmers Mfg. Co., Milwaukee.
Dake Eng. Co., Grand Haven, Mich.
Eric-Ball Eng. Co., Pittsburgh, Pa.
Filer-Stowell Co., Milwaukee.
Hardie-Tynes Mfg. Co., Birmingham, Ala.
J. Loeffel Co., Springfield, O.
Morris Mach. Wks., Baldwinville, N. Y.
Murray Iron Works Co., Burlington, Ia.
Nordberg Mfg. Co., Milwaukee.
B. F. Starvatt Eng. Co., Hyde Park, Boston.
Viller Mfg. Co., Milwaukee.
- ENGINES, SWINGING**
*Dake Eng. Co., Grand Haven, Mich.
Lidgerwood Mfg. Co., N. Y.
- EXCAVATING MACHINERY (See Names Under Excavators, Also Steam Shovels)**
- EXCAVATORS, CABLEWAY**
*Street Bros. Mach. Co., Chattanooga.
Amer. Mfg. & Eng. Co., Kalamazoo, Mich.
Bucyrus Co., So. Milwaukee, Wis.
Ersted Machy. Mfg. Co., Portland, Ore.
Lidgerwood Mfg. Co., N. Y.
- EXCAVATORS, DITCH AND TRENCH**
*Barber-Greene Co., Aurora, Ill.
*Bay City Dredge Wks., Bay City, Mich.
*Buckeye Trac. Ditcher Co., Findlay, O.
*Byers Mach. Co., Ravenna, O.
*Clyde Ir. Wks. Sales Co., Duluth, Minn.
*Erie Steam Shovel Co., Erie, Pa.
*Harnischfeger Corp., Milwaukee.
*Insley Mfg. Co., Indianapolis, Ind.
*Keystone Driller Co., Beaver Falls, Pa.
*Lidgerwood Mfg. Co., N. Y.
*Marion Steam Shovel Co., Marion, O.
*Orton Crane & Shovel Co., Chicago.
*Russell Grader Mfg. Co., Minneapolis.
*Street Bros. Mach. Co., Chattanooga.
American Hat & Derrick Co., St. Paul.
Austin Mach. Corp'n., Muskegon, Mich.
Brown Hsg. Machy. Co., Cleveland.
Bucyrus Co., So. Milwaukee, Wis.
Cleveland Trencher Co., Euclid, O.
Economy Exe. Co., Iowa Falls, Ia.
Ersted Machy. Mfg. Co., Portland, Ore.
Hayward Co., N. Y.
Monaghan Mach. Co., Chicago.
Ongood Co., Marion, O.
Owensboro Ditcher & Grader Co., Owensboro, Ky.
Parsons Co., Newton, Ia.
Speder Machy. Corp., Fairfield, Ia.
O. T. Topping Machy. Co., Dayton, O.
- EXCAVATORS, DRAG-LINE**
*Bay City Dredge Wks., Bay City, Mich.
*Byers Mach. Co., Ravenna, O.
*Clyde Ir. Wks. Sales Co., Duluth, Minn.
*Erie Steam Shovel Co., Erie, Pa.
*Gallen Ir. Wks. & Mfg. Co., Gallon, O.
*Harnischfeger Corp., Milwaukee, Wis.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*

A New P & H Trencher



8 New and Exclusive Features

1 *Three Bucket Speeds without sprocket change*—to provide for maximum excavating for any kind of soil encountered—back feed for cutting under sidewalks, etc.

2 *Crowding* (patent applied for)—for use when needed, but readily detached.

3 *Dual Control* from either side—operator can stand where best view of work is possible.

4 *Most accessible trencher ever built*—all parts easy to get at—easy to maintain.

5 *Safety Clutch* at point of shock—no strains passed on to driving mechanism.

6 *Safety Enclosure* for all gears and shafts—gears run in oil.

7 *Corduroy Traction*—self-cleaning double sprockets, bushed link pins—long life.

8 *Three High Traction Speed*

* * *

The ideas incorporated in these features are the result of over 13 years' experience in the manufacture of trench excavators. P & H quality of materials and workmanship insure long life and low maintenance.

Use this Trencher on your job this year. It stands the gaff—saves time—and will make bigger profits for you.

Get a copy of our new Bulletin 18-X. It contains complete information.

HARNISCHFEGER CORPORATION

Successors to

PAWLING & HARNISCHFEGER CO.

Established in 1884

3819 National Ave., Milwaukee, Wis.

New York
Philadelphia
Birmingham
Chicago

Kansas City
San Francisco
Detroit

Dallas
Pittsburgh
Portland

Memphis
Los Angeles
Seattle

Jacksonville
Indianapolis
Charlotte

Miami
Tampa
Atlanta

Warehouses and Service Stations: Philadelphia Memphis San Francisco Los Angeles Jacksonville Seattle

P & H TRENCH EXCAVATORS

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Where to Purchase

15

*Marion Steam Shovel Co., Marion, O.
 *Orton Crane & Shovel Co., Chicago
 *Russell Grader Mfg. Co., Minneapolis.
 *Sasman Bros., Chicago.
 *T. L. Smith Co., Milwaukee, Wis.
 *Street Bros. Mach. Co., Chattanooga
 Austin Machy. Corp., Muskegon, Mich.
 Brown Hstg. Machy. Co., Cleveland, O.
 Browning Crane Co., Cleveland, O.
 Bucyrus Co., So. Milwaukee, Wis.
 Economy Exc. Co., Iowa Falls, Ia.
 Ersted Machy. Mfg. Co., Portland, Ore.
 C. L. Gade Exc. Wks., Iowa Falls, Ia.
 Hayward Co., N. Y.
 Industrial Wks., Bay City, Mich.
 Lidgetwood Mfg. Co., N. Y.
 Link-Belt Co., Chicago.
 Monaghan Mach. Co., Chicago.
 Osgood Co., Marion, O.
 Speder Machy. Corp., Fairfield, Ia.
 Thew Shovel Co., Lorain, O.

EXPANDED METAL

*Truscon Steel Co., Youngstown, O.
 Berger Mfg. Co., Canton, O.
 Consolidated Exp. Metal Co., Braddock, Pa.
 Kalman Steel Co., Chicago.
 Northwestern Exp. Metal Co., Chicago.
 Youngstown Pressed St. Co., Warren, O.

EXPANSION JOINT MATERIAL

*Barber Asphalt Co., Philadelphia.
 *Barrett Co., N. Y.
 *Phillip Carey Co., Cincinnati, O.
 *W. H. Meadows, Inc., Elgin, Ill.
 *Texas Co., N. Y.
 *Truscon Steel Co., Youngstown, O.
 Hoosier Asph. Co., Alexandria, Ind.
 Pioneer Asph. Co., Lawrenceville, Ill.
 Serviced Products Corp., Chicago
 Waring-Underwood Co., Philadelphia.

EXPLOSIVES

*Hercules Powder Co., Wilmington, Del.
 Atlas Powder Co., Wilmington, Del.
 E. I. Du Pont de Nemours & Co., Wilmington, Del.
 Giant Powder Co., S. Francisco, Cal.
 Grasselli Powder Co., Cleveland, O.

FENCING

*Stewart Ir. Wks. Co., Cincinnati, O.
 Adrian Wire Fence Co., Adrian, Mich.
 Amer. Fence & Const. Co., New York
 American Steel & Wire Co., Chicago.
 Anchor Post Iron Works, N. Y.
 Cyclone Fence Co., Waukegan, Ill.
 Driggins Wire Fence Co., Anderson, Ind.
 Frost-Superior Fence Co., Warren, O.
 Ind. Steel & Wire Co., Muncie, Ind.
 Interlocking Fence Co., Morton, Ill.
 Keystone Stl. & Wire Co., Peoria, Ill.
 Kokomo Stl. & Wire Co., Kokomo, Ind.
 Nitselman Bros., Muncie, Ind.
 Mich. Wire Fence Co., Adrian, Mich.
 Page Stl. & Wire Prod. Corp., Bridgeport, Conn.
 Pittsburgh Steel Co., Pittsburgh, Pa.
 Tex. Cyclone Fence Co., Ft. Worth, Tex.
 Wickwire-Spencer Steel Co., N. Y.
 Youngstown Sheet & Tube Co., Youngstown, O.

FILING EQUIPMENT STEEL

Art Metal Constr. Co., Jamestown, N. Y.
 Berger Mfg. Co., Canton, O.
 Gen. Fireproofing Co., Youngstown, O.
 Van Dorn Iron Wks., Cleveland, O.

FILTERS, OIL

S. F. Bowser & Co., Inc., Ft. Wayne, Ind.
 Wayne Tank & Pump Co., Ft. Wayne, Ind.

FILTERS, WATER

Amer. Water Softener Co., Phila., Pa.
 Graver Corporation, E. Chicago, Ind.
 International Filter Co., Chicago.
 Norwood Eng. Co., Florence, Mass.
 Roberts Filter Co., Darby, Pa.
 W. B. Seale & Sons, Pittsburgh, Pa.

FINISHING MACHINES, CONCRETE ROAD (See Concrete Road Finishers)

FIRE ALARM SYSTEMS

Gamewell Co., Newton Upper Falls, Mass.

FIRE ALARM SIRENS

*Union Water Meter Co., Worcester, Mass.
 Erick Elec. Siren Co., St. Paul, Minn.
 Federal Sign System, Chicago.
 Hendrie & Bolthoff Mfg. & Sup. Co., Denver, Colo.
 Sterling Siren Fire Alarm Co., Rochester, N. Y.

FIRE APPARATUS, MOTOR

*Mack Trucks, Inc., N. Y.
 Ahrens-Fox Fire Eng. Co., Cincinnati, O.
 American-La France Fire Eng. Co., Elmira, N. Y.
 Boyer Fire App. Co., Logansport, Ind.
 Brookway Motor Fire App. Co., Cortlandt, N. Y.
 Foamite-Childs Corp., Utica, N. Y.
 Hale Fire Pump Co., Conshohocken, Pa.
 Northern Fire Apparatus Co., Minneapolis, Minn.
 Peter Finch & Sons Co., Kenosha, Wis.
 Prospect Fire Engine Co., Prospect, O.
 Seagrave Co., Columbus, O.
 Stuts Fire Eng. Co., Indianapolis, Ind.
 Watrous Fire Eng. Wks., St. Paul, Minn.
 White Co., Cleveland

FIRE EXTINGUISHERS, CHEMICAL

American-LaFrance Fire Eng. Co., Elmira, N. Y.
 Buffalo Fire App. Corp., Buffalo, N.Y.
 C. J. Cross Mfg. Co., Inc., N. Y.
 Foamite-Childs Co., Utica, N. Y.
 Pyrene Mfg. Co., Newark, N. J.

FIRE HOSE (See Hose, Fire)

FIREPROOF BUILDING MATERIAL

*Truscon Steel Co., Youngstown, O.
 Berger Mfg. Co., Canton, O.
 Detroit Stl. Prod. Co., Detroit, Mich.
 Gen. Fireproofing Co., Youngstown, O.
 Kalman Steel Co., Chicago.
 Keasbey & Mattison Co., Ambler, Pa.
 Kinnear Mfg. Co., Columbus, O.
 National Fireproofing Co., Pittsburgh.
 U. S. Gypsum Co., Chicago.
 Youngstown Pressed Steel Co., Warren, O.

FIRST AID EQUIPMENT

American-La France Fire Engine Co., Elmira, N. Y.

FITTINGS, ACID RESISTING

*Barber Asphalt Co., Philadelphia

FLEXIBLE JOINTS

*U. S. C. I. Pipe & Fdry Co., Burlington, N. J.
 Central Foundry Co., N. Y.
 Coldwell-Wilcox Co., Newburgh, N. Y.
 Crane Co., Chicago.
 United Lead Company, N. Y.

FLOORING, COMPOSITION

*Barber Asphalt Co., Phila., Pa.
 *Barrett Co., N. Y.
 Am. Mason Safety Tr. Co., Lowell, Mass.
 Johns-Manville, Inc., N. Y.
 Marine Decking & Sup. Co., Phila., Pa.
 Franklin R. Muller & Co., Waukegan, Ill.

FLOORS, WOOD BLOCK

*Barrett Co., N. Y.
 Carter Blomend Flooding Co., Kansas City, Mo.
 Jennison-Wright Co., Toledo, O.
 Midland Cross. Co., Toledo, O.
 Republic Cross. Co., Indianapolis, Ind.
 Sou. Wood Preserving Co., Atlanta, Ga.
 Wyckoff Pipe & Cross. Co., N. Y.

FLUSH TANKS

*Pacific Flush Tank Co., Chicago & N.Y.

FLUSHERS, STREET (See Street Flushers and Sprinklers)

FORD AND FORDSON EQUIPMENT

AIR COMPRESSORS FOR FORDSONS
 *Curtis Pneum. Mach. Co., St. Louis.
 *Ingersoll-Rand Co., New York
 *Schramm, Inc., West Chester, Pa.

AIR COMPRESSORS FOR FORD TRUCKS

*Buhl Co., Chicago.
 *Domestic Eng. & Pump Co., Shippensburg, Pa.
 *Ingersoll-Rand Co., New York
 *Schramm, Inc., West Chester, Pa.

BACKFILLERS

Waterman Corp., Detroit

CONCRETE MIXERS ON FORD TRUCKS

*Amer. Cem. Mach. Co., Keokuk, Ia.
 Archer Iron Wks., Chicago
 Milwaukee Conc. Mixer Co., Milwaukee.

DUMP BODIES FOR FORD TRUCKS

*Eagle Wagon Wks., Auburn, N. Y.
 *Easton Car & Const'n Co., Easton, Pa.
 *Heil Co., Milwaukee, Wis.
 *Herr Dump Body Mfg. Co., Coatesville, Pa.

*Marion Steel Body Co., Marion, O.

*N. Y. Cent. Iron Wks. Co., Inc., Hagerstown, Md.

*Stewart Iron Wks. Co., Cincinnati, O.

*Superior Body Corp., Marion, Ind.

*Wood Hydr. Hoist & Body Co., Detroit.

American Prod. & Trd. Co., Chicago.

Anthony Co., Streator, Ill.

Archer Iron Works, Chicago.

Columbian Stl. Tank Co., K. City, Mo.

Ditwiler Mfg. Co., Gallon, O.

Gallon All Steel Body Co., Gallon, O.

Griscorn-Russell, N. Y.

Hughes-Keenan Co., Mansfield, O.

Jennings Auto. Dump Body Co., Roanoke, Va.

Lee Trailer & Body Co., Chicago.

Mandt Co., Keokuk, Ia.

Martin-Parry Corp., York, Pa.

Pechstein Iron Works, Keokuk, Ia.

Thompson Mfg. Co., Williston, S. C.

Van Dorn Iron Wks., Cleveland, O.

FORD MOTOR PUMPER

*Am. Stm. Pump Co., Battle Creek, Mich.

FORD PLOWS

Roderick Lean Mfg. Co., Mansfield, O.

FORD REPLACEMENT UNITS (AXLES AND TRANSMISSIONS)

*Fuller & Sons Mfg. Co., Kalamazoo.
 *Hinchley Motors, Inc., Detroit, Mich.
 *Waukesha Motor Co., Waukesha, Wis.
 *Warford Corp., N. Y.
 Ruckstell Sales & Mfg. Co., N. Y.

FORD SPECIAL BODIES

Standard Comm. Body Corp., B'klyn.

FORD TRUCK EXTENSION FRAMES

Swedish Crucible Steel Co., Detroit.

FORDSON DITCHING MACHINE

Chas. T. Topping, Dayton, O.

FORDSON HOISTS

*Clyde Ir. Wks. Sales Co., Duluth, Minn.
 Ersted Mach. Mfg. Co., Portland, Ore.
 Okla. Eng. & Fdry. Co., Muskogee, Okla.
 Otis Eng. Corp., N. Y.
 Sheffield Tool & Sup. Co., Sheffield, Pa.
 Squier-Rix Co., Milwaukee.

FORDSON LOCOMOTIVES

Adamsen Motor Co., Birmingham, Ala.
 Brookville Truck & Tractor Co., Brookville, Pa.

Indicates that the manufacturer carries an advertisement. See index facing inside back cover.



For Heavy Grading

Where real scarifying and deep ditching must be done, the Trackson Full-Crawler with one-man power Fordson graders, is the most practical equipment.

Its great track area of 1,100 square inches takes the grader through the hardest of soil or the muddiest ditches without any trouble.

Its all steel construction gives it the sturdiness to stand up and keep going under severe punishment.

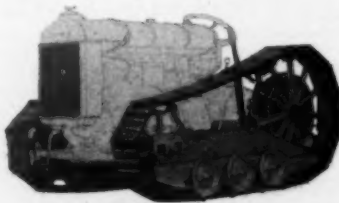
Its flexibility of power and speed gives it a range for every job; slow for heavy, fast for light work. To learn about this equipment will cost you nothing and will show you how to reduce your costs. Write for information today.

The Full-Crawler Co.

Dept. of Geo. H. Smith Steel Casting Co.

519 Clinton St.

Milwaukee, Wis.



Where to Purchase

17

FORDSON POWER SHOVELS

- *Anthony Co., Streator, Ill.
- *Insley Mfg. Co., Indianapolis, Ind.
- Glasgow Eng. Co., St. Louis, Mo.
- Mandt Company, Keokuk, Ia.
- Milwaukee Elec. Crane & Mfg. Co., Milwaukee.
- Squier-Rix Co., Milwaukee.

FORDSON ROAD GRADERS

- *Gallen Ir. Wks. & Mfg. Co., Gallien, O.
- *Good Rds. Mach. Co., Kennett Sq., Pa.
- *Hadfield-Pensfeld Stl. Co., Bucyrus, O.
- *Russell Grader Mfg. Co., Minneapolis
- J. D. Adams & Co., Indianapolis, Ind.
- C. D. Edwards Mfg. Co., Albert Lea, Minn.
- Gilbert Mfg. Co., Aberdeen, S. D.
- Shaw-Enoch's Tractor Co., Minneapolis
- Wehr Co. Milwaukee, Wis.

FORDSON ROAD ROLLERS

- *Acme Road Mch. Co., Frankfort, N. Y.
- *Austin-Western Rd. Mach. Co., Chicago.
- *Gallen Ir. Wks. & Mfg. Co., Gallien, O.
- *Good Rds. Mch. Co., Kennett Sq., Pa.
- Horst & Strietor Co., Davenport, Ia.

FORDSON SAW RIGS

- *Amer. Saw Mill Mch. Co., Hacketts-town, N. J.
- *Miami Trailer-Scraper Co., Troy, O.

FORDSON SCRAPER OUTFITS

- *Miami Trailer-Scraper Co., Troy, O.
- *Gustav Schaefer Wagon Co., Cleveland, O.
- Killefer Mfg. Co., Los Angeles, Calif.
- Miskin Scraper Wks., Ucon, Idaho.

FORDSON TRACTION TREADS

- *Belle City Mfg. Co., Racine, Wis.
- *Full-Crawler Co., Milwaukee, Wis.
- *Tractor Grip Wheel Co., Toledo, O.

FORDSON TRACTOR TRUCKS

- Toppins Trac. Truck Co., Appleton, Wis.

FORDSON TRAILER EQUIPMENT

- *Easton Car & Const'n Co., Easton, Pa.
- *Miami Trailer-Scraper Co., Troy, O.
- Trail-Ford Corp., Ann Arbor, Mich.
- Trailmobile Co., Cincinnati, O.
- Troy Trailer & Wagon Co., Troy, O.
- Whitehead & Kales Co., Detroit.

FORDSON TRUCK LOADERS

- *Gallen Ir. Wks. & Mfg. Co., Gallien, O.
- *George Hais Mfg. Co., N. Y.
- *Spears-Weiss Mch. Co., Oakland, Cal.
- Lessman Loader Mfg. Co., Des Moines, Ia.
- Nelson Iron Wks., Passaic, N. J.
- Specialty Eng. Co., Philadelphia, Pa.

FORGES

- *Hauck Mfg. Co., B'lyn, N. Y.
- Buffalo Forge Co., Buffalo, N. Y.
- Champion Blower & Forge Co., Lancaster, Pa.

FORGES, OIL (Rivet Heating)

- *Hauck Mfg. Co., B'lyn, N. Y.
- *Mead-Morrison Mfg. Co., E. Boston.

FORM CLAMPS

- *Insley Mfg. Co., Indianapolis, Ind.
- *M. & M. Wire Clamp Co., Minneapolis
- Marion Mall. Iron Wks., Marion, Ind.
- Universal Form Clamp Co., Chicago.

FORMS, CONCRETE

- *Blaw-Knox Co., Pittsburgh, Pa.
- *Connery & Co., Phila., Pa.
- *Holtzel Stl. Form & Ir. Co., Warren, O.
- *Hotchkiss Stl. Products Co., Bingham-ton, N. Y.
- *Lakewood Eng. Co., Cleveland, O.
- *Raber & Lang Mfg. Co., Kendallville, Ind.

- *Truscon Steel Co., Youngstown, O.
- Concrete Form Co., Inc., Syracuse, N.Y.
- Metal Forms Corp., Milwaukee.

FORMGRADERS

- Edward G. Carr, Chicago.

FOUNTAINS, DRINKING

- Casey-Hedges Co., Chattanooga, Tenn.
- Jas. B. Clow & Sons, Chicago.
- Crane Co., Chicago.
- Murdock Mfg. & Sup. Co., Cincinnati.
- Pure San. Dr. Ptn. Co., Haydenville, Mass.
- Rundle-Spence Mfg. Co., Milwaukee.
- Stewart Iron Wks. Co., Cincinnati, O.
- Halsey W. Taylor Co., Warren, O.
- Century Brass Wks., Belleville, Ill.

FURNITURE AND FILES, STEEL

- Art Metal Const. Co., Jamestown, N.Y.
- Gen. Fireproofing Co., Youngstown, O.
- Van Dorn Ir. Wks. Co., Cleveland, O.

FURRING AND SLEEPER ANCHORS

- Dayton Sure Grip & Shore Co., Day-ton, O.

GARBAGE CANS (See Cans)

GARBAGE DISPOSAL

- American Beccari Corp., N. Y.
- Balmer Corp., N. Y.
- C. O. Bartlett & Snow Co., Cleveland, O.
- Decarie Incinerator Co., L. I. C., N. Y.
- Goder Incinerator Corp., Chicago.
- Hiler Eng. & Const. Co., B'klyn, N. Y.
- Morse-Boulger Destructor Co., N. Y.
- Nye Odorless Crematory Co., Macon, Ga.

GARBAGE TRUCKS AND BODIES

- *Hell Co., Milwaukee, Wis.
- *Watson Truck Corp., Canastota, N. Y.
- Geo. H. Holsbrog & Bro., Jeffersonville, Ind.
- Lee Trailer & Body Co., Chicago.
- Tiffin Wagon Co., Tiffin, O.

GAS METERS (See Meters, Gas)

GAS PRODUCERS

- Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
- R. D. Wood & Co., Phila., Pa.

GASOLINE STORAGE TANKS

- *Hell Co., Milwaukee, Wis.
- *Littleford Bros., Cincinnati, O.
- Biggs Boiler Works, Akron, O.
- Birmingham Tank Co., B'mingham, Ala.
- S. F. Bowser & Co., Inc., Ft. Wayne, Ind.
- Chicago Bridge & Iron Wks., Chicago.
- Graver Corp., E. Chicago, Ind.
- Wm. B. Scalfie & Sons, Pittsburgh, Pa.
- Tokheim Oil Tank & Pump Co., Ft. Wayne, Ind.
- United Iron Wks., Inc., K. City, Mo.
- Wayne Tank & Pump Co., Ft. Wayne, Ind.

GATES, SLUICE

- Chapman Valve Mfg. Co., Indian Or-chard, Mass.
- Coffin Valve Co., Boston, Mass.
- Coldwell-Wilcox Co., Newburgh, N. Y.
- R. Hardesty Mfg. Co., Denver.
- Ludlow Valve Mfg. Co., Troy, N. Y.

GATES FOR PAPER AND CEMENTERIES

- *Stewart Iron Wks. Co., Cincinnati, O.

GAUGES, WATER

- Bristol Co., Waterbury, Conn.
- Lunkenheimer Co., Cincinnati, O.
- Walworth Mfg. Co., Boston.

GAUGES, SURFACE, RESERVOIR AND

SPECIAL WATER-WORKS

- Builders Iron Fdry., Providence, R. I.
- Simplex Valve & Meter Co., Phila., Pa.

GLASS, FIREPROOF (See Wire Glass)

GOVERNORS, GASOLINE ENGINE

- *Pickering Governor Co., Portland, Ct.

GRADERS, ROAD (See Road Graders)

GRADER BLADES

- *Gallen Ir. Wks. & Mfg. Co., Gallien, O.
- *Russell Grader Mfg. Co., Minneapolis
- J. D. Adams & Co., Indianapolis, Ind.
- Shunk Mfg. Co., Bucyrus, O.

GRAND STANDS, PORTABLE

- Circle A. Prod. Corp., Newcastle, Ind.
- Leavitt Mfg. Co., Urbana, Ill.
- Wayne Iron Wks., Wayne, Pa.

GRINDERS AND SAND HAMMERS

- *Ingersoll-Rand Co., N. Y.
- *Chicago Pneum. Tool Co., N. Y.
- Cleveland Pneum. Tool Co., Cleveland, O.
- Wm. H. Keller, Inc., Grand Haven, Mich.

GYPSUM PRODUCTS

- U. S. Gypsum Co., Chicago.

HAMMERS, STEAM, FILE (See File Hammers, Steam)

HEAT INSULATING MATERIAL

- *Phillip Carey Co., Cincinnati, O.
- Johns-Manville, Inc., N. Y.

HEATING KETTLES (See Kettles)

HITCHES

- *Gustav Schaefer Wagon Co., Cleveland, O.

HOISTS, AUTOMATIC

- *Zetterlund Hst. & Mach. Co., Milwaukee

HOISTS, BELT-DRIVEN

- *Amer. Saw Mill Mch. Co., Hacketts-town, N. J.
- *Dobbie Fdry. & Mach. Co., Niagara Falls.
- *Harnischfeger Corp., Milwaukee, Wis.
- *Mead-Morrison Mfg. Co., East Boston
- *Mundy Sales Corp., N. Y.
- *Street Bros. Mach. Wks., Chatta., Tenn.
- American Hoist & Derrick Co., St. Paul, Minn.
- Lidgerwood Manufacturing Co., N. Y.
- Weller Mfg. Co., Chicago.

HOISTS, CONCRETE, TOWER

- *Insley Mfg. Co., Indianapolis, Ind.
- *Lakewood Eng. Co., Cleveland, O.
- *Mead-Morrison Mfg. Co., East Boston
- *Ransome Conc. Mch. Co., Dunmellon, N.J.
- *Street Bros. Mach. Wks., Chattanooga
- Lidgerwood Manufacturing Co., N. Y.

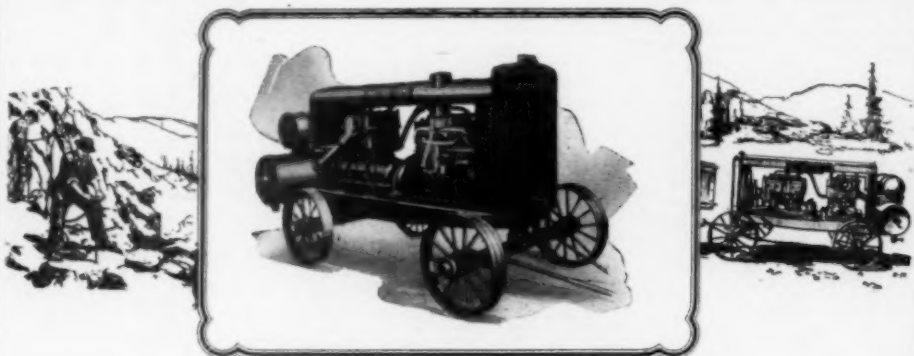
HOISTS, ELECTRIC

- *Clyde Iron Wks. Sales Co., Duluth, Minn.
- *Dobbie Fdry. & Mach. Co., Niagara Falls
- *S. Flory Mfg. Co., Bangor, Pa.
- *Harnischfeger Corp., Milwaukee.
- *Mead-Morrison Mfg. Co., E. Boston.
- *Mundy Sales Corp., N. Y.
- *O. K. Clutch & Mach. Co., Columbia, Pa.
- *Street Bros. Mach. Wks., Chatta., Tenn.
- *Vulcan Iron Wks., Wilkes-Barre, Pa.
- Am. Hoist & Derrick Co., St. Paul, Minn.
- Christholm-Moore Mfg. Co., Cleveland, O.
- Ntl. Hoisting Eng. Co., Harrison, N. J.
- Lidgerwood Manufacturing Co., N. Y.
- Thomas Elev. Co., Chicago.
- Treadwell Eng. Co., Easton, Pa.

HOISTS, GASOLINE

- *Am. Cam. Mch. Co., Inc., Keokuk, Ia.
- *Amer. Saw Mill Mch. Co., Hacketts-town, N. J.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*



Where Road Building Requires Rock Drilling

EVERY road-building project requiring the excavation of rock calls for the use of machine-drilling equipment. In these days of high-priced labor, such work cannot be done by hand.

A complete Ingersoll-Rand Portable Rock Drilling Plant, consisting of an Air Compressor, "Jackhammer" Rock Drills, and a "Leyner" Drill Steel Sharpener, insures a larger profit and an earlier completion of the job.

To operate I-R labor-aiding tools, there are six sizes of portable Compressors. The unit suitable for the particular job can readily be selected.

Ingersoll-Rand Company, the manufacturer, assumes complete responsibility for the performance of the entire outfit. There is a sales and service station near you. Let the I-R engineers help you with your problems.



The "Jackhammer" is an essential part of every road contractor's equipment.

Holes from 1 to 25 ft. can be quickly and economically drilled.



The economy of your rock drilling depends upon the drill steel bits. Sharpener-made bits drill faster, last longer, and insure larger profits.



INGERSOLL-RAND COMPANY—11 BROADWAY, NEW YORK CITY

Offices in principal cities the world over

65 PC

FOR CANADA REFER-CANADIAN INGERSOLL-RAND CO., LTD.—300 ST. JAMES ST., MONTREAL, QUEBEC.

Ingersoll-Rand

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Where to Purchase

19

*Amer. Mfg. & Eng. Co., Kalamazoo, Mich.
 *Clyde Iron Wks. Sales Co., Duluth, Minn.
 *Constr. Mch'y. Co., Waterloo, Ia.
 *Domestic Eng. & Pump Co., Shippensburg, Pa.
 *S. Flory Mfg. Co., Bangor, Pa.
 *Harnischfeger Corp., Milwaukee.
 *Lansing Co., Lansing, Mich.
 *Mead-Morrison Mfg. Co., E. Boston.
 *Mundy Sales Corp., N. Y.
 *Novo Engine Co., Lansing, Mich.
 *O.K. Clutch & Mach. Co., Columbia, Pa.
 *Pioneer Tractors, Inc., Winona, Minn.
 *Street Bros. Mach. Wks., Chatta., Tenn.
 Amer. Hoist & Der. Co., St. Paul, Minn.
 C. H. & E. Mfg. Co., Milwaukee.
 Buffalo Hoist & Derrick Co., Buffalo, N. Y.
 Ersted Mch'y. Mfg. Co., Portland, Ore.
 Lidgetwood Manufacturing Co., N. Y.
 Ntl. Hoisting Eng. Co., Harrison, N. J.
 Orr & Sembower, Reading, Pa.
 Schramm, Inc., West Chester, Pa.
 Squier-Rix Co., Milwaukee.
 Thomas Elevator Co., Chicago.

HOISTS, PNEUMATIC

*Curtis Pneum. Mch'y. Co., St. Louis
 *Dake Engine Co., Grand Haven, Mich.
 *Denver Rock Drill Mfg. Co., Denver.
 *Ingersoll-Rand Co., N. Y.
 *Mead-Morrison Mfg. Co., E. Boston.
 *Sullivan Mch'y. Co., Chicago.
 Chicago Pneumatic Tool Co., N. Y.
 Detroit Hoist & Mach. Co., Detroit.
 Gilman Mfg. Co., E. Boston, Mass.
 Hanna Eng. Works, Chicago.
 Independent Pneum. Tool Co., Chicago.
 Northern Eng. Wks., Detroit, Mich.
 Worthington Pump & Mch'y. Corp., N. Y.

HOISTS, STEAM

*Clyde Iron Wks. Sales Co., Duluth, Minn.
 *Dake Eng. Co., Grand Haven, Mich.
 *Denver Rock Drill Mfg. Co., Denver.
 *S. Flory Mfg. Co., Bangor, Pa.
 *Ingersoll-Rand Co., N. Y.
 *Insley Mfg. Co., Indianapolis, Ind.
 *Mead-Morrison Mfg. Co., E. Boston.
 *Mundy Sales Corp., N. Y.
 *Street Bros. Mach. Wks., Chattanooga.
 Amer. Hoist & Derrick Co., St. Paul, Minn.
 Hardie-Tyres Mfg. Co., Birmingham, Ala.
 Lidgetwood Manufacturing Co., N. Y.
 Ntl. Hoisting Eng. Co., Harrison, N. J.
 Orr & Sembower, Reading, Pa.
 Thomas Elev. Co., Chicago.
 Treadwell Eng. Co., Easton, Pa.

HOISTS FOR MOTOR TRUCKS

*Hill Co., Milwaukee.
 *Wood Hydr. Hoist & Body Co., Detroit.
 Borg & Beck Co., Chicago.
 Detroit Trailer & Mach. Co., Detroit.
 Hydr. Hoist Mfg. Co., St. Paul, Minn.
 Lidgetwood Manufacturing Co., N. Y.
 Rock Mfg. Co., Waterloo, N. Y.
 Superior Body Corp., Marion, Ind.
 Van Dorn Iron Wks., Cleveland, O.

HOLLOW TILE

P. Bannon Pipe Co., Louisville, Ky.
 Wm. E. Dee Co., Chicago.
 W. S. Dickey Clay Mfg. Co., Kansas City, Mo.
 Medal Paving Brick Co., Cleveland, O.
 Metropolitan Pav. Brick Co., Canton, O.
 Ntl. Fireproofing Co., Pittsburgh, Pa.

HOPPERS, CONCRETE (Aggregate Measuring)

*Insley Mfg. Co., Indianapolis, Ind.
 *Lakewood Eng. Co., Cleveland, O.
 *Littleford Bros., Cincinnati, O.
 *Ransome Conc. Mch'y. Co., Dunellen, N. J.

HOSE, AIR

*The Dallett Co., Phila., Pa.
 *Ingersoll-Rand Co., N. Y.
 Chicago Pneumatic Tool Co., N. Y.
 Cincinnati Rubber Mfg. Co., Cincinnati.
 Cleveland Rock Drill Co., Cleveland, O.
 Gilman Mfg. Co., E. Boston, Mass.
 Goodyear Tire & Rubber Co., Akron, O.
 Mulconroy Co., Inc., Phila., Pa.
 Penna. Flexible Metallic Tubing Co., Phila., Pa.
 Republic Rubber Co., Youngstown, O.
 U. S. Rubber Co., N. Y.

HOSE, FIRE

Bi-Lateral Fire Hose Co., Chicago.
 Eureka Fire Hose Mfg. Co., N. Y.
 Fabric Fire Hose Co., N. Y.
 B. F. Goodrich Rubber Co., Akron, O.
 Goodyear Tire & Rubber Co., Akron, O.

HOUSE NUMBERS

Hamilton Metal Prod. Co., Hamilton, O.
 Niagara Metal Stamping Corp., Niagara Falls, N. Y.

HOUSES, PORTABLE (See Buildings, Portable)

HYDRANTS, FIRE

Chapman Valve Mfg. Co., Indian Orchard, Mass.
 Columbian Ir. Wks., Chatta., Tenn.
 Darling Valve & Mfg. Co., Williamsport, Pa.
 Eddy Valve & Mfg. Co., Waterford, N. Y.
 Iowa Valve Co., Oskaloosa, Ia.
 Kennedy Valve Mfg. Co., Elmira, N. Y.
 Ludlow Valve Mfg. Co., Troy, N. Y.
 Norwood Eng. Co., Florence, Mass.
 Rensselaer Valve Co., Troy, N. Y.
 A. P. Smith Mfg. Co., E. Orange, N. J.
 R. D. Wood & Co., Phila., Pa.

HYDRAULIC RAMS

Deming Co., Salem, O.
 Rife Hydraulic Engine Co., N. Y.
 Rumsey Pump Co., Seneca Falls, N. Y.
 Seattle Mach. Works, Seattle, Wash.

ICE-MAKING MACHINERY

*Ingersoll-Rand Co., New York
 Arctic Ice Mach. Co., Canton, O.
 Baker Ice Mach. Co., Omaha, Neb.
 Brunswick-Kroeschell Co., N. Brunswick, N. J.
 Carbondale Mach. Co., Carbondale, Pa.
 De La Vergne Mach. Co., N. Y.
 Frick Co., Inc., Waynesboro, Pa.
 Triumph Ice Mach. Co., Cincinnati, O.
 United Iron Wks., Inc., K. City, Mo.
 Vilter Mfg. Co., Milwaukee, Wis.
 Henry Vogt Mach. Co., Louisville, Ky.
 York Mfg. Co., York, Pa.

INCINERATORS, GARBAGE (See Garbage Disposal)

INDICATOR POSTS (See Valves)

INSPECTING LABORATORIES

*Conard & Busby, Burlington, N. J.
 Allentown Testing Lab., Allentown, Pa.
 E. L. Conwell & Co., Phila., Pa.
 Gulick-Henderson Co., N. Y.
 Robert W. Hunt & Co., Chicago.
 N. Y. Testing Lab., N. Y.
 Pittsburgh Testing Lab., Pittsburgh.
 Standard Testing Lab., Inc., N. Y.

INSTRUMENTS AND SUPPLIES (Surveyors' and Engineers')

Wm. Ainsworth & Sons, Denver, Col.
 L. Beckman Co., Toledo, O.
 C. L. Berger & Sons, Boston.
 Brandis & Sons Mfg. Co., B'klyn, N. Y.
 Buff & Buff Mfg. Co., Boston.
 Eugene Dietzgen Co., Chicago.
 W. & L. E. Gurley, Troy, N. Y.
 Keuffel & Esser Co., Hoboken, N. J.
 A. Lietz Co., San Francisco.
 Leopold & Voelpel, Portland, Ore.

Warren Knight Co., Phila., Pa.
 F. Weber & Co., Phila., Pa.
 David White Co., Milwaukee, Wis.

IRON WORK, STRUCTURAL AND ORNAMENTAL (See Bridges and Buildings)

JACKS, LIFTING

*McKiernan-Terry Drill Co., N. Y.
 *Oil Jack Co., N. Y.
 Duff Mfg. Co., Pittsburgh, Pa.
 Joyce-Cridland Co., Dayton, O.
 A. O. Norton, Inc., Boston.
 Rees Mfg. Co., Pittsburgh, Pa.
 Templeton, Kenly & Co., Ltd., Chicago.
 Watson-Stillman Company, N. Y.

JACKS, PIPE FORCING

Duff Mfg. Co., Pittsburgh, Pa.

JAIL AND PRISON WORK

*Stewart Iron Wks. Co., Cincinnati, O.
 E. T. Barnum Iron Wks., Detroit.
 Fries & Son Steel Const. & Eng. Co., Covington, Ky.
 Pauly Jail Bldg. Co., St. Louis, Mo.
 Van Dorn Ir. Wks. Co., Cleveland, O.

JOINTS, EXPANSION PAVING (See Expansion Joint Material)

JOINTS, FLEXIBLE PIPE (See Flexible Joints)

JOISTS, STEEL

*Truscon Steel Co., Youngstown, O.
 Berger Mfg. Co., Canton, O.
 Gen'l Fireproof. Bldg. Products, Youngstown, O.

KETTLES, FOR ASPHALT AND TAR

*Acme Rd. Mach. Co., Frankfort, N. Y.
 *Aeroll Burner Co., Union Hill, N. J.
 *Barber Asphalt Co., Phila., Pa.
 *Chausse Oil Burner Co., Elkhart, Ind.
 *Connery & Co., Inc., Phila., Pa.
 *Good Rds. Mch'y. Co., Kennett Sq., Pa.
 *Hauk Mfg. Co., B'klyn, N. Y.
 *Jos. Honhorst Co., Cincinnati, O.
 *Littleford Bros., Cincinnati, O.
 *Spears-Wells Mch'y. Co., Oakland, Cal.
 *G. L. Stuebner Ir. Wks., Inc., Long Island City, N. Y.
 *Union Iron Wks., Inc., Hoboken, N. J.
 *Universal Rd. Mach. Co., Kingston, N. Y.
 Birmingham Tank Co., Birmingham, Ala.
 Chase & Lyman, Boston, Mass.
 Kinney Mfg. Co., Boston, Mass.
 Macleod Co., Cincinnati, O.
 Tarrant Mfg. Co., Saratoga Spgs., N. Y.

LANTERNS, CONTRACTORS'

*Alex. Milburn Co., Baltimore, Md.
 Adams & Westlake Co., Chicago.
 Defiance Lantern & Stamping Co., Rochester, N. Y.
 R. E. Diets Co., N. Y.
 Handlan, Buck Mfg. Co., St. Louis.
 Star Headlight & Lantern Co., Rochester, N. Y.

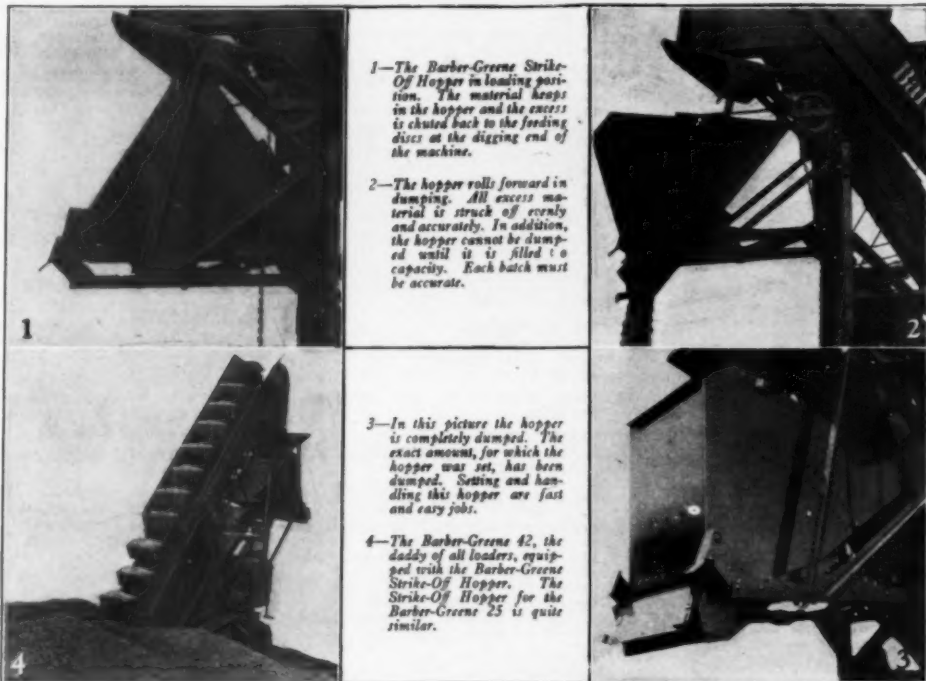
LATH, METAL

*Truscon Steel Co., Youngstown, O.
 Berger Mfg. Co., Canton, O.
 Bostwick Steel Lath Co., Niles, O.
 Gen. Fireproofing Co., Youngstown, O.
 Milwaukee Corr. Co., Milwaukee, Wis.
 Northwestern Exp. Metal Co., Chicago.
 Penn. Metal Co., Boston, Mass.
 Sykes Metal Lath & Roofing Co., Niles, O.
 Youngstown Pressed Steel Co., Warren, O.

LAWN MOWERS

Chadborn & Coldwell Mfg. Co., Newburgh, N. Y.
 Coldwell Lawn Mower Co., Newburgh, N. Y.
 Gilson Mfg. Co., Port Washington, Wis.
 Ideal Power Lawn Mower Co., Lansing, Mich.
 Jacobson Mfg. Co., Racine, Wis.
 Penna. Lawn Mower Wks., Phila., Pa.
 Phila. Lawn Mower Co., Phila., Pa.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*



Batching Aggregates Quickly, Accurately

The Barber-Greene Strike-Off Hopper Makes the Accurate Measuring of Each Batch an Easy Job

The Barber-Greene Strike-Off Hopper measures each batch accurately.

Batch sizes can be changed in $\frac{1}{2}$ cubic foot at a time—from 8 cubic feet to 24 cubic feet on the Model 42 and from 8 cubic feet to 14 cubic feet on the Model 25. The 42's capacity is enough to handle the stone for a 1-2-4 six-bag mix, or 7-sack 1-2-3 mix.

Setting the hopper for batches of different sizes is a quick, easy and fool-proof job. All that is necessary is to adjust the hopper bottom to the quantity desired.

And the rolling strike-off measures each batch to that quantity.

With strike-off hoppers the two Barber-

BARBER-GREENE COMPANY—Representatives in 50 Cities—485 W. Park Ave., Aurora Illinois,

Greene's, Model 42 and Model 25, make advance storage still more desirable.

The Barber-Greene patented Disc-Feed can be adjusted to clean up the materials thoroughly without digging dirt. And it provides the loading speed that keeps the mixer busy.

And the new hopper assures accurate batches.

For sand batching and loading, the new Barber-Greene 25 should be used. It is the same machine as the 42, except in size and capacity.

Contracting with Barber-Greene tells more about the new strike-off hopper. And it takes you on an inspection tour of more than 50 contracting jobs. Send for a copy today.

BARBER GREENE
 Portable Belt Conveyors Self Feeding Bucket Loaders
 Coal Loaders . Automatic Ditch Diggers Snow Loaders Coal Feeders

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Where to Purchase

21

S. P. Townsend Co., Bloomfield, N. J.
Western Implement Co., Porth Washington, Wis.
Worthington Mower Co., Stroudsburg, Pa.

LEADITE

The Leadite Co., Phila., Pa.

LEAD-MELTING FURNACES

*Aeroll Burner Co., Union Hill, N. J.
*Hauck Mfg. Co., B'klyn, N. Y.
*Littleford Bros., Cincinnati, O.
Canton Fdry. & Mch. Co., Canton, O.
Chicago Flexible Shaft Co., Chicago.
Geo. Focht's Sons, Hoboken, N. J.
A. P. Smith Mfg. Co., E. Orange, N. J.

LETTERING GUIDES

Wood-Regan Instrument Co., N. Y.

LETTERS AND FIGURES, METAL

Niagara Metal Stamp Corp., Niagara Falls, N. Y.

LIGHTS, CONTRACTORS'

*Alex. Milburn Co., Baltimore, Md.
Carbie Mfg. Co., Duluth, Minn.
General Elec. Co., Schenectady, N. Y.
Hauck Mfg. Co., B'klyn, N. Y.
MacLeod Co., Cincinnati, O.
Prest-O-Lite Co., Inc., N. Y.

LIGHTING STANDARDS (See Street Lamp Posts)

LIQUID CHLORINE

Arnold, Hoffman & Co., Inc., N. Y.
Electro Bleaching Gas Co., N. Y.
Hooker Electrochemical Co., N. Y.
Matheson Alkali Works, Inc., N. Y.
Penna. Salt Mfg. Co., Phila., Pa.

LOADERS, GRAVEL, WAGON, CAR, ETC.

*Atlas Eng. Co., Milwaukee, Wis.
*Barber-Greene Co., Aurora, Ill.
*Bay City Dredge Wks., Bay City, Mich.
*Chicago Automatic Conv. Co., Chicago
*Fairfield Eng. Co., Marion, O.
*Gallion Jr. Wks. & Mfg. Co., Gallion, O.
*Geo. Haisig Mfg. Co., N. Y.
*Nelson Iron Wks., Passaic, N. J.
*Russell Grader Mfg. Co., Minneapolis.
*Sauerman Bros., Chicago.
*T. L. Smith Co., Milwaukee, Wis.
*Spears-Wells Mch. Co., Oakland, Cal.
*Universal Bd. Mach. Co., Kingston, N.Y.
Austin Mach. Corp., Muskegon, Mich.
Bonney Supply Co., Inc., Rochester, N.Y.
Brown Hoisting Mch. Co., Cleveland.
Chain Belt Co., Milwaukee, Wis.
Conant Mach. Co., Concord Junction, Mass.
Gifford-Wood Co., Hudson, N. Y.
Jeffrey Mfg. Co., Columbus, O.
Lee Trailer & Body Co., Chicago.
Link-Belt Co., Chicago.
Portable Mch. Co., Passaic, N. J.
H. B. Sackett Screen & Chute Co., Chicago.
Specialty Eng. Co., Phila., Pa.
Squibb-Rix Co., Milwaukee.
Weller Mfg. Co., Chicago.

LOCKERS, STEEL

Durand Steel Locker Co., Chicago.
Hart & Hutchinson Co., N. Britain, Ct.
Lyon Metallic Mfg. Co., Aurora, Ill.
Fred. Medart Mfg. Co., St. Louis, Mo.

LOCOMOTIVES, FOR CONTRACTORS, ETC.

*Pate-Root-Heath Co., Plymouth, O.
*Vulcan Iron Wks., Wilkes-Barre, Pa.

*Geo. D. Whitcomb Co., Rochelle, Ill.
Adamsen Motor Co., Birmingham, Ala.
Baldwin Loc. Wks., Phila., Pa.
Brookville Tract & Tractor Co., Brookville, Pa.
Davenport Loc. Wks., Davenport, Ia.
Industrial Equip. Co., Minster, O.
Lima Loc. Wks., Lima, O.
Milwaukee Loc. Mfg. Co., Milwaukee.
Plymouth Loc. Wks., Plymouth, O.
H. K. Porter Co., Pittsburgh, Pa.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

LUBRICANTS

*D-A Lubricant Co., Ind'p'l's, Ind.

MANHOLE COVERS (See Castings)

METAL LATH (See "Lath")

METAL ROOFING (See "Roofing")

METER BOXES

H. W. Clark Co., Mattoon, Ill.
Clarksville Fdry. & Mach. Wks., Clarksville, Tenn.
J. B. Clew & Sons, Chicago.
Columbian Ir. Wks., Chattanooga, Tenn.
Ford Motor Box Co., Wabash, Ind.
Mueller Co., Decatur, Ill.
J. S. Schofield's Sons Co., Macon, Ga.

METER COUPLINGS

*Neptune Meter Co., N. Y.
*Pittsburgh Meter Co., Pittsburgh, Pa.
*Union Water Meter Co., Worcester, Mass.
H. W. Clark Co., Mattoon, Ill.
Ford Motor Box Co., Wabash, Ind.
Mueller Co., Decatur, Ill.

METER TESTERS

*Neptune Meter Co., N. Y.
*Pittsburgh Meter Co., Pittsburgh, Pa.
H. W. Clark Co., Mattoon, Ill.
Ford Motor Box Co., Wabash, Ind.
Mueller Co., Decatur, Ill.
National Meter Co., N. Y.

METERS, ELECTRIC (WATTHOUR)

Duncan Elec. Mfg. Co., LaFayette, Ind.
General Elec. Co., Schenectady, N. Y.
Sagamo Elec. Co., Springfield, Ill.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

METERS, Gas

*Pittsburgh Meter Co., Pittsburgh, Pa.
American Meter Co., N. Y.
Bailey Meter Co., Cleveland, O.
Builders Iron Fdry., Providence, R. I.
Cleveland Gas Meter Co., Cleveland, O.

METERS, WATER, OIL & GASOLINE

*Neptune Meter Co., N. Y.
*Pittsburgh Meter Co., Pittsburgh, Pa.
*Union Water Meter Co., Worcester, Mass.
Badger Meter Mfg. Co., Milwaukee.
Buffalo Meter Co., Buffalo, N. Y.
Federal Motor Corp., E. Orange, N. J.
Gamon Meter Co., Newark, N. J.
Harvey Mfg. Co., Boston, Mass.
National Meter Co., N. Y.
Thomson Meter Co., B'klyn, N. Y.
Worthington Pump & Mch. Corp., N.Y.

METERS, WATER (VENTURI TYPE)

Builders Iron Fdry., Providence, R. I.
Simplex Valve & Meter Co., Phila., Pa.

MIXERS, CONCRETE (See Concrete Mixers)

MIXERS, GROUT

*Am. Cem. Mch. Co., Inc., Keokuk, Ia.
*Lakewood Eng. Co., Cleveland, O.
*T. L. Smith Co., Milwaukee, Wis.
*Union Iron Wks., Inc., Hoboken, N. J.
Kent Mach. Co., Kent, O.

MIXERS, HOT

*Barber Asphalt Co., Phila., Pa.
*Keehring Co., Milwaukee, Wis.

MIXERS, MORTAR

*Am. Cem. Mch. Co., Inc., Keokuk, Ia.
*Blaw-Knox Co., Pittsburgh, Pa.
*Blystone Mfg. Co., Cambridge Spgs., Pa.
*Construction Mach. Co., Waterloo, Ia.
*Kiel Mach. Co., Milwaukee
*Lakewood Eng. Co., Cleveland, O.
*Lakewood Eng. Co., Cleveland, O.
*Lansing Co., Lansing, Mich.
*Ransome Conc. Mch. Co., Dunellen, N.J.
*T. L. Smith Co., Milwaukee, Wis.
*Talbot-Flood Mfg. Co., Kansas City, Mo.
Anchor Mfg. Co., Chicago.
Austin Mach. Corp., Muskegon, Mich.
C. H. & E. Mfg. Co., Milwaukee, Wis.
Kent Mach. Co., Kent, O.
Knickerbocker Co., Jackson, Mich.
Marsh-Capron Co., Chicago

MIXERS, PLASTER

*Blystone Mfg. Co., Cambridge Spgs., Pa.
Essick & Co., Los Angeles, Cal.

MOTORCYCLES

Cleveland Motorcycle Co., Cleveland, O.
Excelsior Motor Mfg. & Supply Co., Chicago.
Harley-Davidson Motor Co., Milwaukee
Indian Motorcycle Co., Springfield, Mass.

MOTORS, ELECTRIC (See Electric Generators and Motors)

MOTORS, GASOLINE (See Engines, Gas and Gasoline)

MOTOR TRUCKS

*Ford Motor Co., Detroit.
*General Motors Trk. Co., Detroit, Mich.
*Graham Bros., Detroit
*Mack Trucks, Inc., New York
*Ruggles Motor Truck Co., Saginaw, Mich.
Acme Motor Truck Co., Cadillac, Mich.
Atterbury Motor Car Co., Buffalo, N.Y.
Autocar Co., Ardmore, Pa.
Bessemer Motor Truck Co., Grove City, Pa.
Breckway Motor Truck Co., Cortland, N. Y.
Clydesdale Motor Truck Co., Clyde, O.
Commerce Motor Trk. Co., Ypsilanti, Mich.
Diamond T. Motor Car Co., Chicago.
Federal Motor Truck Co., Detroit.
Four Wheel Drive Auto Co., Clintonville, Wis.
Garford Motor Truck Co., Lima, O.
Gramm Bernstein Tr. Corp., Lima, O.
Gramm & Kincaid Motors, Inc., Lima, O.
The Hug Co., Highland, Ill.
Indiana Truck Corp., Marion, Ind.
Int. Harvester Co., Chicago.
Kelly Springfield Motor Truck Co., Springfield, O.
Larrabee-Deye Motor Tr. Co., Binghamton, N. Y.
Pierce-Arrow Motor Car Co., Buffalo.
Republic Motor Tr. Co., Alma, Mich.
Service Motor Tr. Co., Wabash, Ind.
Standard Motor Truck Co., Detroit.
Sterling Motor Corp., Buffalo, N. Y.
Stewart Motor Corp., Buffalo, N. Y.
Traffic Motor Tr. Co., St. Louis, Mo.
United Motor Products Co., Grand Rapids, Mich.
U. S. Motor Truck Co., Cincinnati, O.
White Co., Cleveland, O.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*

Haulage Cost Cut 35.35%~



Plymouth 18-ton Gasoline Locomotive at Plant of Atlas Rock Co., Stockton, Calif.



WHEN a man buys his first Plymouth Gasoline Locomotive, especially if he has been a steam user, he has two pleasant surprises awaiting him.

First, in the big economy of operation and upkeep.

Second, in the tremendous power developed. Always ready, no coal or water to haul, no boiler troubles, no "stand by" expense, the Plymouth is the solution of your haulage problem.

Made in 3 to 25 ton sizes, and in track gauge.

Name the industry and we will send you Performance Bulletins showing what Plymouths are doing for others in your field.

THE FATE-ROOT-HEATH CO.

234 Riggs Ave.

Plymouth, Ohio

ATLAS ROCK COMPANY

Stockton, Calif., Mar. 4, 1926.

The Fate-Root-Heath Co.,
Plymouth, Ohio.

Gentlemen:

Our Plymouth 18-ton Gasoline Locomotive is giving wonderful service and will outpull our 21-ton steamer.

The Plymouth is hauling three Western-Air-Dump cars, each loaded with 25 tons of gravel, total weight of cars and load 135 tons, up 1 1/4 % grades with 30 degree curves. The haul is one mile long and we make about 2 1/2 trips per hour. We could do better than this if we could load faster.

Accurate cost records show average daily cost of operation, including fuel, labor, repairs and every charge against each unit as follows:

21-ton Steamer, .04183 cents per ton hauled.

18-ton Plymouth, .02703 cents per ton hauled.

Very truly yours,

ATLAS ROCK COMPANY,

(Signed) by Fred R. Beerman,
Gen. Mgr.

PLYMOUTH

Gasoline Locomotives

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Where to Purchase

23

MOULDS, CONCRETE

*Blaw Knox Co., Pittsburgh, Pa.
*Raber & Lang Mfg. Co., Kendallville, Ind.

MUCKING MACHINES

Hoar Shovel Co., Duluth, Minn.

NUMBERS HOUSE (See House Numbers)

OAKUM

Oxwell Acetylene Co., Long Island City, N. Y.

OIL BURNERS

*Acroll Burner Co., Union Hill, N. J.
*Chausse Oil Burner Co., Elkhart, Ind.
*Hauck Mfg. Co., Elyria, N. Y.
*Alex. Milburn Co., Baltimore, Md.
Binks Spray Equip. Co., Chicago

OILS, ROAD

*Barber Asphalt Co., Phila., Pa.
*Barrett Co., N. Y.
*Standard Oil Co. (Indiana), Chicago.
*Texas Company, N. Y.
Atl. Ref. & Asp. Corp., Phila., Pa.
Headley Good Roads Co., Phila., Pa.
Pioneer Asp. Co., Lawrenceville, Ill.
Standard Oil Co. (La.), N. Orleans, La.
Standard Oil Co. (N. J.), Newark, N. J.
Standard Oil Co. (N. Y.), N. Y.

OXY-ACETYLENE APPARATUS

*Alex. Milburn Co., Baltimore, Md.
Oxwell Acetylene Co., Long Island City, N. Y.

PACKING, WATER PIPE

*Union Water Meter Co., Worcester, Mass.
The Leadite Co., Phila., Pa.
United Lead Company, N. Y.

PAINT GUNS

*Alex. Milburn Co., Baltimore, Md.
Binks Spray Eq. Co., Chicago
Chicago Pneum. Tool Co., New York
De Vilbiss Mfg. Co., Toledo, O.
Eclipse Air Brush Co., Newark, N. J.
W. N. Matthews Corp., St. Louis
Paasche Air Brush Co., Chicago
Simons Paint Spray Brush Co., Dayton, O.
Spraco Painting Equip. Co., Boston

PAINTS, METAL PROTECTION

*Barber Asphalt Co., Phila., Pa.
*Barrett Co., N. Y.
*Phillip Carey Co., Cincinnati, O.
*Jos. Dixon Crucible Co., J. City, N. J.
*Solvay Process Co., N. Y.
Acme White Ld. & Col. Wks., Detroit.
Berry Bros., Detroit.
Cook Paint & Varnish Co., K. City, Mo.
Detroit Graphite Co., Detroit.
Detroit White Lead Wks., Detroit.
E. I. Du Pont de Nemours & Co., Inc., Wilmington, Del.
Minwax Co., N. Y.
Protexol Corp., N. Y.
Ruberoid Co., N. Y.
Servicised Products Corp'n, Chicago
Sherwin-Williams Co., Cleveland, O.
L. Sonneborn Sons, Inc., N. Y.
Toeh Bros., N. Y.
Tropical Paint & Oil Co., Cleveland, O.
Truscon Laboratories, Detroit.

PAPERS, BLUE PRINT

Ind'p'la Blue Print & Supply Co., Ind'p'la, Ind.

PAPER, BUILDING, ROOFING, ETC.

*Barber Asphalt Co., Phila., Pa.
*Phillip Carey Co., Cincinnati, O.
*Barrett Co., N. Y.
Bird & Sons, Inc., E. Walpole, Mass.
Brown Co., Portland, Me.
Hydrox Asph. Prod. Corp., N. Y.
Johns-Manville, Inc., N. Y.
Nat. Roofing Co., Tonawanda, N. Y.
Ruberoid Co., N. Y.

PARK BENCHES

*Stewart Iron Wks. Co., Cincinnati, O.

Bausman Mfg. Co., Millersville, Pa.
Logan Co., Louisville, Ky.
Fred J. Meyers Mfg. Co., Hamilton, O.

PAVEMENT BREAKERS (See Breakers)

PAVING AND ROAD ROLLERS. (See Road and Paving Rollers)

PAVING BLOCKS, CREOSOTED WOOD. (See "Creosoted Blocks")

PAVING BRICK

Alton Brick Co., Alton, Ill.
Binghamton Br. Co., Binghamton, N. Y.
Buckeye Shale Brick Co., Cleveland, O.
Buffalo Brick Co., Buffalo, Kans.
Cen. Clay Prod. Co., Wilkes-Barre, Pa.
Cleveland Brick & Clay Co., Cleveland, O.
Clydesdale Brick & Stone Co., Pittsburgh, Pa.
Collinwood Shale Brick Co., Cleveland, O.
Corry Brick & Tile Corp., Corry, Pa.
Georgia Vit. Brick Co., Augusta, Ga.
Globe Brick Co., E. Liverpool, O.
Hammond Fire Brick Co., Fairmount, W. Va.
Hixylvania Coal Co., Columbus, O.
Hocking Val. Brick Co., Columbus, O.
Layton Fire Clay Co., McKeesport, Pa.
McAvoy Vit. Brick Co., Phila., Pa.
C. P. Mayer Brick Co., Bridgeville, Pa.
Metropolis Pav. Br. Co., Pitts'b'h, Kan.
Metropolitan Pav. Br. Co., Canton, O.
Mineral Wells Pav. Br. Co., Mineral Wells, Tex.
Moberly Pav. Br. Co., Moberly, Mo.
Murphysboro Pav. Brick Co., Murphysboro, Ill.
Nelsonville Brick Co., Nelsonville, O.
Patton Clay Mfg. Co., Patton, Pa.
Paxton Brick Co., Watsonstown, Pa.
Peoples Pav. Br. Co., Portsmouth, O.
Peoria Brick & Tile Co., Peoria, Ill.
Purinton Pav. Br. Co., Galesburg, Ill.
Russell Clay Mfg. Co., Alton, Ala.
So. Clay Mfg., Chattanooga, Tenn.
Spfld. Pav. Br. Co., Springfield, Ill.
Streator Brick Co., Olean, N. Y.
Streator Clay Mfg. Co., Streator, Ill.
Terre Haute Vit. Brick Co., Terre Haute, Ind.
Thornton Fire Brick Co., Clarksburg, W. V.
Thurber Brick Co., Thurber, Tex.
Toronto Fire Clay Co., Toronto, O.
Trinidad Br. & Tile Co., Trinidad, O.
United Clay Prod. Corp., Kansas City
Veederburg Paver Co., Veederburg, Ind.
West'n Shale Prod. Co., Ft. Scott, Kan.
Westport Pav. Br. Co., Westport, Md.

W. Va.
Hixylvania Coal Co., Columbus, O.
Hocking Val. Brick Co., Columbus, O.
Layton Fire Clay Co., McKeesport, Pa.
McAvoy Vit. Brick Co., Phila., Pa.
C. P. Mayer Brick Co., Bridgeville, Pa.
Metropolis Pav. Br. Co., Pitts'b'h, Kan.
Metropolitan Pav. Br. Co., Canton, O.
Mineral Wells Pav. Br. Co., Mineral Wells, Tex.
Moberly Pav. Br. Co., Moberly, Mo.
Murphysboro Pav. Brick Co., Murphysboro, Ill.
Nelsonville Brick Co., Nelsonville, O.
Patton Clay Mfg. Co., Patton, Pa.
Paxton Brick Co., Watsonstown, Pa.
Peoples Pav. Br. Co., Portsmouth, O.
Peoria Brick & Tile Co., Peoria, Ill.
Purinton Pav. Br. Co., Galesburg, Ill.
Russell Clay Mfg. Co., Alton, Ala.
So. Clay Mfg., Chattanooga, Tenn.
Spfld. Pav. Br. Co., Springfield, Ill.
Streator Brick Co., Olean, N. Y.
Streator Clay Mfg. Co., Streator, Ill.
Terre Haute Vit. Brick Co., Terre Haute, Ind.
Thornton Fire Brick Co., Clarksburg, W. V.
Thurber Brick Co., Thurber, Tex.
Toronto Fire Clay Co., Toronto, O.
Trinidad Br. & Tile Co., Trinidad, O.
United Clay Prod. Corp., Kansas City
Veederburg Paver Co., Veederburg, Ind.
West'n Shale Prod. Co., Ft. Scott, Kan.
Westport Pav. Br. Co., Westport, Md.

W. Va.
Hixylvania Coal Co., Columbus, O.
Hocking Val. Brick Co., Columbus, O.
Layton Fire Clay Co., McKeesport, Pa.
McAvoy Vit. Brick Co., Phila., Pa.
C. P. Mayer Brick Co., Bridgeville, Pa.
Metropolis Pav. Br. Co., Pitts'b'h, Kan.
Metropolitan Pav. Br. Co., Canton, O.
Mineral Wells Pav. Br. Co., Mineral Wells, Tex.
Moberly Pav. Br. Co., Moberly, Mo.
Murphysboro Pav. Brick Co., Murphysboro, Ill.
Nelsonville Brick Co., Nelsonville, O.
Patton Clay Mfg. Co., Patton, Pa.
Paxton Brick Co., Watsonstown, Pa.
Peoples Pav. Br. Co., Portsmouth, O.
Peoria Brick & Tile Co., Peoria, Ill.
Purinton Pav. Br. Co., Galesburg, Ill.
Russell Clay Mfg. Co., Alton, Ala.
So. Clay Mfg., Chattanooga, Tenn.
Spfld. Pav. Br. Co., Springfield, Ill.
Streator Brick Co., Olean, N. Y.
Streator Clay Mfg. Co., Streator, Ill.
Terre Haute Vit. Brick Co., Terre Haute, Ind.
Thornton Fire Brick Co., Clarksburg, W. V.
Thurber Brick Co., Thurber, Tex.
Toronto Fire Clay Co., Toronto, O.
Trinidad Br. & Tile Co., Trinidad, O.
United Clay Prod. Corp., Kansas City
Veederburg Paver Co., Veederburg, Ind.
West'n Shale Prod. Co., Ft. Scott, Kan.
Westport Pav. Br. Co., Westport, Md.

PAVING MACHINERY (See Road and Paving Machinery)

PAVING GUARDS, STEEL

*W. S. Godwin Co., Baltimore, Md.

PAVING MATERIALS (See "Asphalt," "Paving Brick," "Granite Block," etc.)

PAVING MIXERS (See Concrete Mixers)

PAVING TOOLS

*Acroll Burner Co., Union Hill, N. J.
*Barber Asphalt Co., Phila., Pa.
*Chausse Oil Burner Co., Elkhart, Ind.
*Connery & Co., Inc., Phila., Pa.
*Littleford Bros. Co., Cincinnati, O.
*Union Iron Wks. Inc., Hoboken, N. J.
*Warren Bros. Co., Boston.
W. H. Anderson Tl. & Sup. Co., Detroit.
F. D. Cummer & Sons Co., Cleveland, O.

PERFORATED METALS

Allis-Chalmers Mfg. Co., Milwaukee
Hendrick Mfg. Co., Carbondale, Pa.

PICKS

Beall Tool Co., E. Alton, Ill.

Hubbard Co., Pittsburgh, Pa.
Iron City Tool Wks., Pittsburgh.
Klein-Logan Co., Pittsburgh.
Oliver Iron & Steel Co., Pittsburgh, Pa.
Verona Tool Wks., Verona, Pa.
Warren Tool & Forge Co., Warren, O.
Warwood Tool Co., Wheeling, W. Va.
Wyoming Shovel Wks., Wyoming, Pa.

PILE DRIVERS

*Clyde Ir. Wks. Sales Co., Duluth, Minn.
*McKiernan-Terry Drill Co., N. Y.
*Mead-Morrison Mfg. Co., E. Boston.
*Union Iron Wks., Inc., Hoboken, N. J.
Browning Crane Co., Cleveland, O.
Industrial Wks., Bay City, Mich.
Lidgerwood Manufacturing Co., N. Y.
McMyler Interstate Co., Cleveland, O.

PILE HAMMERS, STEAM

*Clyde Ir. Wks. Sales Co., Duluth, Minn.
*McKiernan-Terry Drill Co., N. Y.
*Union Iron Wks., Inc., Hoboken, N. J.
Industrial Wks., Bay City, Mich.
Ntl. Hoisting Eng. Co., Harrison, N. J.
Vulcan Iron Wks., Chicago.

PILING, CONCRETE

MacArthur Conc. Pile & F'd'n Co., N. Y.
Raymond Conc. Pile Co., N. Y.

PILING, INTERLOCKING STEEL

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., Pittsburgh, Pa.

PIPE, CAST IRON

*U. S. Cast Iron Pipe & Fdry. Co., Burlington, N. J.
Am. Cast Ir. Pipe Co., Birmingham, Ala.
Central Fdry. Co., N. Y.
J. B. Clow & Sons, Chicago.
Donaldson Iron Co., Emaus, Pa.
John Fox & Co., N. Y.
Glamorgan Pipe & Fdry. Co., Lynchburg, Va.
Lynchburg Fdry. Co., Lynchburg, Va.
McWane C. I. Pipe Co., Birmingham, Ala.
Nat. O. I. Pipe Co., Birmingham, Ala.
Warren Fdry. & Machine Co., N. Y.
R. D. Wood & Co., Phila., Pa.

PIPE, CULVERT (See Culverts)

PIPE, LEAD

United Lead Company, N. Y.

PIPE, REINFORCED CONCRETE

*Newark Conc. Pipe Co., Newark, N. J.
Concrete Prod. Co., Pittsburgh, Pa.
Core Joint Conc. Pipe Co., Baltimore.
Independent Conc. Pipe Co., Indianapolis.
Lock Joint Pipe Co., E. Orange, N. J.
Massey Conc. Prod. Corp., Chicago.

PIPE, RIVETED STEEL OR IRON

*Blaw-Knox Co., Pittsburgh, Pa.
*Connery & Co., Inc., Phila., Pa.
*Jos. Honhorst Co., Cincinnati, O.
*Littleford Bros., Cincinnati, O.
Abendroth & Root Mfg. Co., Newburg, N. Y.
American Spiral Pipe Wks., Chicago.
Canton Culvert & Silo Co., Canton, O.
Chatta. Boiler & Tk. Co., Chatta., Tenn.
Chicago Bridge & Ir. Wks., Chicago.
E. Jersey Pipe Co., N. Y.
Hammond Ir. Wks., Warren, Pa.
R. Hardesty Mfg. Co., Denver.
Lancaster Iron Wks., Lancaster, Pa.
Petroleum Ir. Wks. Co., Sharon, Pa.
Pittsburgh-Des Moines Stl. Co., Pittsburgh, Pa.
Tippet & Wood, Phillipsburg, N. J.
Weller Mfg. Co., Chicago.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*

Why Use a Wood Tower and Buggies to Place Your Concrete?

THEY are worth very little when the job is done. For approximately the same money you can buy an Insley Steel Mast Boom Plant, with a three-wheelbarrow Material Elevator.

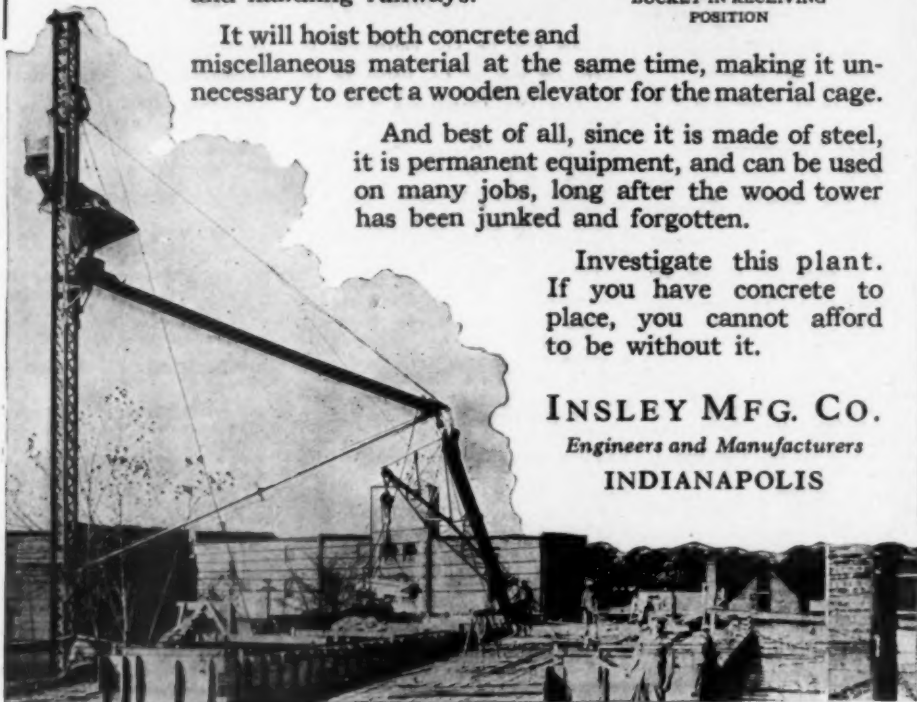
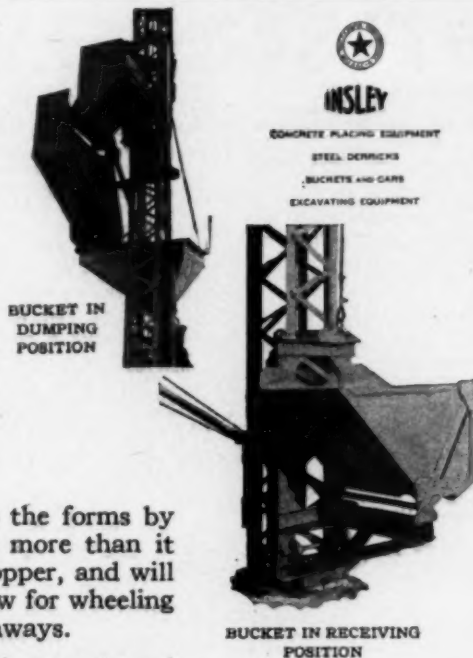
It will deliver concrete to the forms by means of chutes for a little more than it costs to place it in a floor hopper, and will eliminate the crew for wheeling and handling runways.

It will hoist both concrete and miscellaneous material at the same time, making it unnecessary to erect a wooden elevator for the material cage.

And best of all, since it is made of steel, it is permanent equipment, and can be used on many jobs, long after the wood tower has been junked and forgotten.

Investigate this plant. If you have concrete to place, you cannot afford to be without it.

INSLEY MFG. CO.
Engineers and Manufacturers
INDIANAPOLIS



When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Where to Purchase

25

PIPE, SPIRAL RIVETED

Abendroth & Root Mfg. Co., Newburg, N. Y.
American Spiral Pipe Wks., Chicago

PIPE, STEEL

Central Tube Co., Pittsburgh, Pa.
E. Jersey Pipe Co., N. Y.
Jones & Laughlin Stl. Co., Pittsburgh
National Tube Co., Pittsburgh
Republic Ir. & Stl. Co., Youngstown, O.
South Chester Tube Co., Chester, Pa.
Spang-Chalfont & Co., Pittsburgh, Pa.
Wheeling Stl. Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, WOOD

Amer. Wood Pipe Co., Tacoma, Wash.
Mich. Pipe Co., Bay City, Mich.
Pacific Tank & Pipe Co., S. Francisco.
Redwood Mfrs. Co., S. Francisco.
Standard Wd. Pipe Co., Williamsport, Pa.
A. Wyckoff & Sons Co., Elmira, N. Y.

PIPE, WROUGHT IRON

A. M. Byers Co., Pittsburgh, Pa.
Reading Iron Co., Reading, Pa.

PIPE BENDING MACHINES

Ams. Pipe Bending Mach. Co., Boston.
Walworth Mfg. Co., Boston.

PIPE COVERING

AIRCELL

*Phillip Carey Co., Cincinnati, O.
Ehret Mag. Mfg. Co., Valley Forge, Pa.
Johns-Manville, Inc., N. Y.
Kearney & Mattison Co., Ambler, Pa.
Ntl. Asbestos Co., Jersey City, N. J.
Norristown Mag. & Asb. Co., Norristown, Pa.
Sall Mountain Co., Chicago
H. F. Watson Co., Erie, Pa.

85 PER CENT MAGNESIA

*Phillip Carey Co., Cincinnati, O.
Ehret Mag. Co., Valley Forge, Pa.
Johns-Manville, Inc., N. Y.
Kearney & Mattison Co., Ambler, Pa.

WOOD

Redwood Mfrs. Co., San Francisco.
Ric-Wil Co., Cleveland, O.
A. Wyckoff & Son Co., Elmira, N. Y.

PIPE CUTTERS (See Cutters, Pipe, Hand)

PIPE FITTINGS

*U. S. Cast Iron Pipe & Fdy. Co., Burlington, N. J.
Amer. C. I. Pipe Co., Birmingham, Ala.
Builders Iron Fdy., Providence, R. I.
Central Fdy. Co., N. Y.
J. B. Clow & Sons, Chicago.
Crane Co., Chicago.
Donaldson Iron Co., Emaus, Pa.
Lunkenheimer Co., Cincinnati, O.
Ntl. O. I. Pipe Co., Birmingham, Ala.
Reading Stl. Casting Co., Inc., Bridgeport, Conn.
Warren Fdy. & Mach. Co., N. Y.
R. D. Wood & Co., Phila., Pa.

PIPE HANDLING MACHINERY

Mueller Company, Decatur, Ill.
Squier-Rix Co., Milwaukee
Taylor Port. Stl. Derrick Co., Chicago.

PIPE JOINT COMPOUND (Sewer)

*Phillip Carey Co., Cincinnati, O.
*Pacific Flush Tank Co., Chi. and N. Y.
G. K. Sales Co., Macungie, Pa.
Leadite Company, Inc., Phila., Pa.
Ruberoid Co., N. Y.

Waring-Underwood Co., Phila., Pa.

PIPE JOINT MATERIAL (Cast Iron)

Hydraulic Development Co., Boston.
The Leadite Co., Phila., Pa.
United Lead Co., N. Y.

PLAYGROUND APPARATUS

American Playground Device Co., Anderson, Ind.
Chicago Gym. Equip. Co., Chicago.
Everwear Mfg. Co., Springfield, O.
Giant Mfg. Co., Council Bluffs, Ia.
Hill-Standard Co., Anderson, Ind.
Fred. Medart Mfg. Co., St. Louis, Mo.
Mitchell Mfg. Co., Milwaukee.
Patterson-Williams Co., San Jose, Cal.
Playground Equipment Co., N. Y.
A. G. Spalding & Bros., Chicopee, Mass.
F. B. Zieg Mfg. Co., Fredericktown, O.

PLOWS, CONTRACTORS'

*Austin-West's Rd. Mach. Co., Chicago
*Burch Plow Wks. Co., Crestline, O.
*Caterpillar Trac. Co., San Leandro, Cal.
*Gallon Ir. Wks. & Mfg. Co., Gallon, O.
*Russell Grader Mfg. Co., Minneapolis.
*Wiard Plow Co., Batavia, N. Y.
J. D. Adams & Co., Ind'polis, Ind.
American Steel Scraper Co., Sidney, O.
Deere & Co., Moline, Ill.
C. D. Edwards Mfg. Co., Albert Lea, Minn.
International Harvester Co., Chicago.
Moline Plow Co., Rock Island, Ill.
Oliver Chilled Plow Wks., S. Bend, Ind.
Roderick Lean Mfg. Co., Mansfield, O.
Sidney Steel Scraper Co., Sidney, O.
Slusser-McLean Scraper Co., Sidney, O.
Western Wheel Scraper Co., Aurora, Ill.

PLUMBING SUPPLIES

J. B. Clow & Sons, Chicago.
Crane Co., Chicago.
Glauber Brass Mfg. Co., Cleveland, O.
J. L. Mott Iron Wks., N. Y.
Mueller Company, Decatur, Ill.
Rundt-Spence Mfg. Co., Milwaukee.
Walworth Mfg. Co., Boston.

POLES, STEEL STRUCTURAL

*Blaw-Knox Co., Pittsburgh, Pa.
Elec. Ry. Equip. Co., Cincinnati, O.
Pittsb'h-Des Moines Stl. Co., Pittsb'h.

PORTABLE BUILDINGS

*Blaw-Knox Co., Pittsburgh, Pa.
*Littleford Bros., Cincinnati, O.
*Truscon Steel Co., Youngstown, O.
Milwaukee Corr. Co., Milwaukee, Wis.

PORTABLE STEEL DERRICKS (See Derricks, Steel Portable)

PORTABLE WOOD WORKERS

Jaeger Portable Power Corp., Detroit

PORTLAND CEMENT (See Cement)

POWDER (See Explosives)

POWER PLANTS, INDUSTRIAL

*Alamo Engine Co., Hillsdale, Mich.
*Climax Eng. Co., Clinton, Ia.
*Continental Motors Corp., Detroit, Mich.
*Hercules Corp., Evansville, Ind.
*Hercules Motors Corp., Canton, O.
*Hinkley Motors, Inc., Detroit.
*Waukesha Motor Co., Waukesha, Wis.
Buda Co., Harvey, Ill.
Sanderon-Cyclone Drill Co., Orrville, O.
Wisconsin Motor Co., Milwaukee

PULLING MACHINES

John Waldron Corp., New Brunswick, N. J.

PUMPS, AIR LIFT

*Am. Stm. Pump Co., Battle Creek, Mich.
*Ingersoll-Rand Co., N. Y.
*Sullivan Mach. Co., Chicago.
Chicago Pneum. Tool Co., New York
Harris Air Pump Co., Indianapolis.
Indiana Air Pump Co., Indianapolis.

PUMPS, BOILER FEED

*Am. Stm. Pump Co., Battle Creek, Mich.
*Ingersoll-Rand Co., New York
Allis-Chalmers Mfg. Co., Milwaukee.
Aurora Pump & Mfg. Co., Aurora, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Stm. Pump Co., Buffalo, N. Y.
A. S. Cameron Stm. Pump Wks., N. Y.
Dayton-Dowd Co., Quincy, Ill.
Dean Bros. Co., Indianapolis, Ind.
Dean Hill Pump Co., Anderson, Ind.
De Laval Stm. Turb. Co., Trenton, N. J.
Deming Co., Salem, O.
Erie Pump & Eng. Wks., Medina, N. Y.
Fairbanks, Morse & Co., Chicago.
Gardner Governor Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Indiana Air Pump Co., Indianapolis.
LeCourtenay Co., Newark, N. J.
Morris Mach. Wks., Baldwinville, N. Y.
Murray Iron Wks., Burlington, Ia.
Northern Fire App. Co., Minneapolis.
Rumsey Pump Co., Seneca Falls, N. Y.
Scranton Pump Co., Scranton, Pa.
Union Stm. Pump Co., Battle Creek, Mich.
Vogt Bros. Mfg. Co., Louisville, Ky.
Warren Stm. Pump Co., Warren, Mass.
Weinman Pump Mfg. Co., Columbus, O.
Yeomans Bros. Co., Chicago.

PUMPS, CENTRIFUGAL

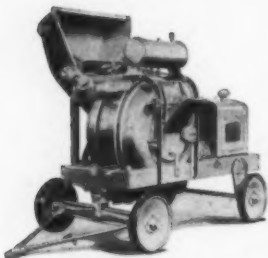
*Am. Stm. Pump Co., Battle Creek, Mich.
*Domestic Eng. & Pump Co., Shippensburg, Pa.
*Humphreys Mfg. Co., Mansfield, O.
*Ingersoll-Rand Co., New York
*Keystone Driller Co., Beaver Falls, Pa.
*Schramm, Inc., West Chester, Pa.
Allis-Chalmers Mfg. Co., Milwaukee.
Amer. Well Works, Aurora, Ill.
Aurora Pump & Mfg. Co., Aurora, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
A. S. Cameron Stm. Pump Wks., N. Y.
Dayton-Dowd Co., Quincy, Ill.
De Laval Stm. Turb. Co., Trenton, N. J.
Erie Pump & Eng. Wks., Medina, N. Y.
Fairbanks, Morse & Co., Chicago.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Indiana Air Pump Co., Indianapolis.
LeCourtenay Co., Newark, N. J.
Manistee Iron Wks., Manistee, Mich.
Morris Mach. Wks., Baldwinville, N. Y.
Novo Eng. Co., Lansing, Mich.
Rumsey Pump Co., Seneca Falls, N. Y.
United Iron Wks., Inc., K. City, Mo.
Wheeler Condenser & Eng. Co., Carteret, N. J.
Worthington Pump & Mch. Corp., N. Y.
Yeomans Bros. Co., Chicago.

PUMPS, CONTRACTORS'

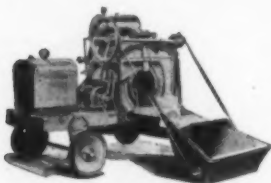
*Am. Stm. Pump Co., Battle Creek, Mich.
*Construction Mch. Co., Waterloo, Ia.
*Domestic Eng. & Pump Co., Shippensburg, Pa.
*Humphreys Mfg. Co., Mansfield, O.
*Ingersoll-Rand Co., New York
*Novo Engine Co., Lansing, Mich.
*Schramm, Inc., West Chester, Pa.
*T. L. Smith Co., Milwaukee
*Standard Scale & Sup. Co., Pittsb'h.
*Waukesha Motor Co., Waukesha, Wis.
Allis-Chalmers Mfg. Co., Milwaukee.
Amer. Well Wks., Aurora, Ill.
Aurora Pump & Mfg. Co., Aurora, Ill.
Barnes Mfg. Co., Mansfield, O.
Buda Co., Harvey, Ill.
A. S. Cameron Stm. Pump Wks., N. Y.
Ralph B. Carter Co., N. Y.
O. H. & E. Mfg. Co., Milwaukee.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*

KOEHRING 7-S DANDIE Mixer



Charging Skip goes to high angle charging position—shoots materials into drum without pounding skip! Note low automatic water measuring tank and Disc Wheels! Liberal drum dimensions!

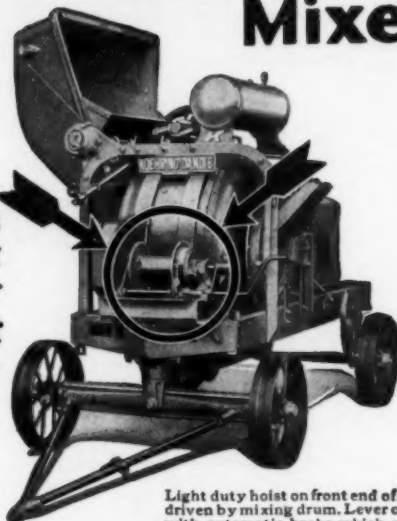


Engine completely enclosed in dust-tight steel housing, sides of which raise for fullest accessibility to engine! Discharge operated from both sides of mixer.



Low charging platform, steel frame of which is hinged to mixer, and can be folded up against mixer frame for hauling from job to job! Wide, capacious charging hopper makes charging easy.

**With
Light
Duty
Hoist**



Light duty hoist on front end of mixer, driven by mixing drum. Lever control with automatic brake which applies when clutch is thrown out. Capacity 400 feet of $\frac{5}{16}$ -inch cable. Hoisting speed 67 feet to 100 feet per minute.

N^O — not the cheapest mixer in the light mixer field, not cheap in any detail or in any part but the remarkable value, the big profit earner among light mixers! And still the price is within the price range for light mixers!

FAST! Fast in charging and fast in discharging—a record maker in getting concrete into the forms where it pays you profit. If you're out of extra profit day by day, don't fail to send back the coupon and know all about the Dandie.

4 cylinder, radiator-cooled engine, or 2 cylinder, hopper-cooled engine!

Worm gear reduction unit mounted on roller bearings, enclosed in dust tight steel housing and running in continuous oil bath. Big bronze-bushed drum roller bearings! Double gear drum driver! Power-charging skip, or low charging platform, automatic water measuring tank. Rubbertires and disc wheels or steel rimmed wheels. A. G. C. Standards!

Send Back the Coupon

KOEHRING COMPANY MILWAUKEE WISCONSIN
PAVERS, MIXERS—GASOLINE SHOVELS, CRANES AND DRAGLINES

Sales Offices and Service Warehouses in all principal cities
Foreign Department—Room 1370, 50 Church St., New York City.
Canada—Koehring Company of Canada, Ltd.,
105 Front Street, East, Toronto, Ontario.
Mexico—F. S. Lapum, Cinco De Mayo 21, Mexico, D. F.

Send Back Coupon for Full Details!

Take our word for it, you will be putting yourself in the way of extra profits and extra value if you learn all about the details of this Dandie Model before you decide on a mixer. No obligations. Send back the coupon today!

A 3201-III

KOEHRING COMPANY, Dept. D-6 MILWAUKEE, WIS.

Without obligation to me of any kind, send me free information about the Koehring Dandie Mixer.

Name.....

Address.....

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Where to Purchase

27

Dayton-Dowd Co, Quincy, Ill.
Deming Co., Salem, O.
Emerson Pump & Valve Co., Alexandria, Va.

Erie Pump & Eng. Wks., Medina, N.Y.
Fairbanks, Morse & Co., Chicago.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Kinney Mfg. Co., Boston
LeCourtenay Co., Newark, N. J.
Morris Mach. Wks., Baldwinville, N.Y.
F. E. Myers & Bro. Co., Ashland, O.
Pulsometer Steam Pump Co., N. Y.
Rumsey Pump Co., Seneca Falls, N. Y.
Van Nounhuys Mach. Wks., Albany, N. Y.
Waldo Bros. & Bond Co., Boston, Mass.

PUMPS, DEEP WELL

*Aldrich Pump Co., Allentown, Pa.
*Am. Stm. Pump Co., Battle Creek, Mich.
*Domestic Eng. & Pump Co., Shippensburg, Pa.
*Humphreys Mfg. Co., Mansfield, O.
*Ingersoll-Rand Co., New York
*Keystone Driller Co., Beaver Falls, Pa.
Amer. Well Wks., Aurora, Ill.
A. S. Cameron Stm. Pump Wks., N.Y.
H. W. Clark Co., Mattoon, Ill.
A. D. Cook, Inc., Lawrenceburg, Ind.
Deming Co., Salem, O.
Fairbanks, Morse & Co., Chicago.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Harris Air Pump Co., Indianapolis.
Indiana Air Pump Co., Indianapolis.
Layne & Bowler Co., Memphis, Tenn.
A. Y. McDonald Mfg. Co., Dubuque, Ia.
Midwest Eng. Co., Indianapolis, Ind.
F. E. Myers & Bro. Co., Ashland, O.
Rumsey Pump Co., Seneca Falls, N. Y.
United Iron Wks., Inc., K. City, Mo.
Weber Subterranean Pump Co., N. Y.

PUMPS, DREDGING

*Ingersoll-Rand Co., New York
Am. Manganese Stl. Co., Chicago
Ellicott Mach. Corp., Baltimore, Md.
Erie Pump & Eng. Co., Medina, N. Y.
Morris Mach. Wks., Baldwinville, N.Y.

PUMPS, GASOLINE AND OIL

*Ingersoll-Rand Co., New York
S. F. Bowser & Co., Inc., Ft. Wayne, Ind.
Gilbert & Barker Mfg. Co., Springfield, Mass.
Kinney Mfg. Co., Boston
Wayne Tank & Pump Co., Ft. Wayne, Ind.

PUMPS, PORTABLE

*Am. Stm. Pump Co., Battle Creek, Mich.
*Humphreys Mfg. Co., Mansfield, O.
Jaeger Portable Power Corp., Detroit

PUMPS, POWER

*Am. Stm. Pump Co., Battle Creek, Mich.
*Domestic Eng. & Pump Co., Shippensburg, Pa.
*Humphreys Mfg. Co., Mansfield, O.
*Ingersoll-Rand Co., New York
*Koehring Co., Milwaukee, Wis.
*Neve Eng. Co., Lansing, Mich.
*Waukesha Motor Co., Waukesha, Wis.
Alamo Iron Wks., San Antonio, Tex.
Allis-Chalmers Mfg. Co., Milwaukee.
Amer. Well Wks., Aurora, Ill.
Auer Pump & Mfg. Co., Aurora, Ill.
Barnes Mfg. Co., Mansfield, O.
Dayton-Dowd Co., Quincy, Ill.
De Laval Stm. Turb. Co., Trenton, N.J.
Deming Co., Salem, O.
Evinrude Motor Co., Milwaukee.
Fairbanks, Morse & Co., Chicago.
Gardner Governor Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Indiana Air Pump Co., Indianapolis.
Kinney Mfg. Co., Boston
Lawrence Mach. Co., Lawrence, Mass.
LeCourtenay Co., Newark, N. J.
F. E. Myers & Bro. Co., Ashland, O.
Nordberg Mfg. Co., Milwaukee.
Northern Fire App. Co., Minneapolis.

Rumsey Pump Co., Seneca Falls, N. Y.
Weisman Pump Mfg. Co., Columbus, O.
Worthington Pump & Mch. Corp., N.Y.
Yeomans Bros. Co., Chicago

PUMPS, SEWAGE

*Am. Stm. Pump Co., Battle Creek, Mich.
*Humphreys Mfg. Co., Mansfield, O.
*Ingersoll-Rand Co., New York
*Pacific Flush Tank Co., Chi. and N. Y.
Sanitation Corp., N. Y.
Yeomans Bros. Co., Chicago.

PUMPS, TAP AND ASPHALT

Kinney Mfg. Co., Boston

RADIATORS FOR GASOLINE ENGINES

Fedders Mfg. Co., Buffalo, N. Y.
G. & O. Mfg. Co., New Haven, Conn.
Harrison Rad. Wks., Lockport, N. Y.
McCord Radiator Mfg. Co., Detroit
Modine Mfg. Co., Racine, Wis.
Racine Radiator Co., Racine, Wis.

RAILS AND RAIL JOINTS

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Easton Car & Const. Co., Easton, Pa.
Koppel Ind. Car & Equip. Co., Koppel, Pa.
Sweet's Steel Co., Williamsport, Pa.

RAILROAD DITCHERS (See Excavators, Ditch and Trench)

RECORDERS, WATER STAGE

Builders Iron Fdry., Providence, R. I.
W. & L. E. Gurley, Troy, N. Y.

REFRIGERATING MACHINERY (See Ice Making Machinery)

REINFORCING, CONCRETE (See Concrete Reinforcement)

RIVETERS, PNEUMATIC

*Ingersoll-Rand Co., N. Y.
Alliance Machine Co., Alliance, O.
Chicago Pneum. Tool Co., New York
Cleveland Pneum. Tool Co., Cleveland, O.
Hanna Eng. Works, Chicago.
Helwig Mfg. Co., St. Paul, Minn.
Independent Pneum. Tool Co., Chicago.
Wm. H. Keller, Inc., Grand Haven, Mich.
Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.
Southwark Fdry. & Mach. Co., Phila.
Watson-Stillman Co., N. Y.

RIVET SETS

*Ingersoll-Rand Co., N. Y.
Chicago Pneum. Tool Co., New York
Cleveland Pneum. Tool Co., Cleveland, O.
Dunbar Drop Forge Co., Chicago.
Independent Pneum. Tool Co., Chicago.

ROAD GRADERS

*Austin-West'n Rd. Mch. Co., Chicago.
*Baker Mfg. Co., Springfield, Ill.
*Gallion Ir. Wks. & Mfg. Co., Gallion, O.
*Good Rds. Mch. Co., Kennett Sq., Pa.
*Haddfield-Pondfield Stl. Co., Bucyrus, O.
*Russell Grader Mfg. Co., Minneapolis.
*Spears-Well's Machy. Co., Oakland, Cal.
J. D. Adams & Co., Indianapolis, Ind.
J. I. Case Threshing Mach. Co., Racine, Wis.
C. D. Edwards Mfg. Co., Albert Lea, Minn.
Gilbert Mfg. Co., Aberdeen, S. D.
Killefer Mfg. Co., Los Angeles
Lyle Culv. & Rd. Equip. Co., Minneapolis
N. S. Monroe & Sons, Arthur, Ill.
Owensboro Ditcher & Grader Co., Owensboro, Ky.
Shaw-Enochs Tractor Co., Minneapolis
Stockland Rd. Mach. Co., Minneapolis.
Western Wheeled Scraper Co., Aurora, Ill.

ROAD OILS (See Oils, Road)

ROAD OILERS

*Austin-West'n Rd. Mch. Co., Chicago.
*Connery & Co., Phila., Pa.

*Good Rds. Mch. Co., Kennett Sq., Pa.
*Pack Trucks, Inc., N. Y.
*Spears-Well's Mch. Co., Oakland, Cal.
F. D. Etnyre & Co., Oregon, Ill.
Kinney Mfg. Co., Boston
White Co., Cleveland, O.

ROAD SCRAPERS

*Acme Rd. Mach. Co., Frankfort, N. Y.
*Austin-West'n Rd. Mch. Co., Chicago
*Baker Mfg. Co., Springfield, Ill.
*Euclid Cr. & Hst. Co., Euclid Village, O.
*Gallion Ir. Wks. & Mfg. Co., Gallion, O.
*Good Rds. Mch. Co., Kennett Sq., Pa.
*Miami Trailer-Scraper Co., Troy, O.
*Russell Grader Mfg. Co., Minneapolis.
*Gustav Schaefer Wagon Co., Cleveland, O.
J. D. Adams & Co., Indianapolis, Ind.
J. I. Case Threshing Mach. Co., Racine, Wis.
Gilbert Mfg. Co., Aberdeen, S. D.
Killefer Mfg. Co., Los Angeles
Lyle Culv. & Rd. Equip. Co., Minneapolis.
Root Spring Scraper Co., Kalamazoo, Mich.
Shaw-Enochs Tractor Co., Minneapolis
Sidney Steel Scraper Co., Sidney, O.
Stockland Rd. Mch. Co., Minneapolis.
Western Wheeled Scraper Co., Aurora, Ill.

ROAD AND PAVING ROLLERS

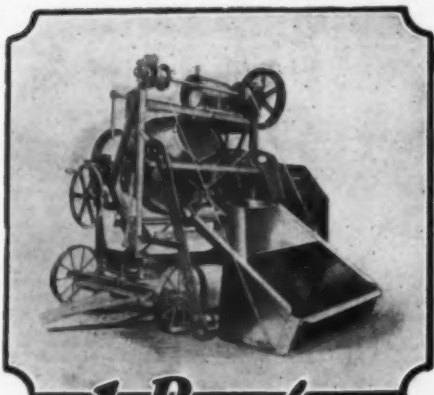
*Austin-West'n Rd. Mch. Co., Chicago.
*Barber Asphalt Co., Phila., Pa.
*Buffalo Springfield Roller Co., Springfield, O.
*Gallion Ir. Wks. & Eng. Co., Gallion, O.
*Good Rds. Mch. Co., Kennett Sq., Pa.
*Huber Mfg. Co., Marion, O.
J. I. Case Threshing Mach. Co., Racine, Wis.

Erie Mach. Shops, Erie, Pa.
Horst & Strieter Co., Davenport, Ia.

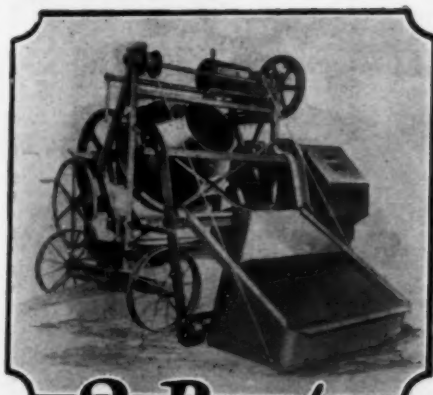
ROAD AND PAVING MACHINERY

*Acme Rd. Mach. Co., Frankfort, N. Y.
*Atlas Eng. Co., Milwaukee.
*Austin-West'n Rd. Mch. Co., Chicago
*Baker Mfg. Co., Springfield, Ill.
*Barber Asphalt Co., Phila., Pa.
*Blaw-Knox Co., Pittsburgh, Pa.
*Buffalo-Springfield Roller Co., Springfield, O.
*Caterpillar Tractor Co., San Leandro, Cal., and Peoria, Ill.
*Chaussee Oil Burner Co., Elkhart, Ind.
*Connery & Co., Inc., Phila., Pa.
*Easton Car & Const. Co., Easton, Pa.
*Equitable Asph. Maint. Co., K. City, Mo.
*Euclid Cr. & Hst. Co., Euclid Village, O.
*Gallion Ir. Wks. & Mfg. Co., Gallion, O.
*Good Rds. Mch. Co., Kennett Sq., Pa.
*Geo. Hais Mfg. Co., N. Y.
*Jos. Honhorst Co., Cincinnati, O.
*Koehring Co., Milwaukee.
*Lakewood Eng. Co., Cleveland, O.
*Littleford Bros., Cincinnati, O.
*Pack Trucks, Inc., N. Y.
*Russell Grader Mfg. Co., Minneapolis.
*T. L. Smith Co., Milwaukee.
*Spears-Well's Mch. Co., Oakland, Cal.
*Universal Rd. Mch. Co., Kingston, N. Y.
J. D. Adams & Co., Indianapolis, Ind.
J. I. Case Threshing Machine Co., Racine, Wis.
F. D. Oumner & Son Co., Cleveland, O.
C. D. Edwards Mfg. Co., Albert Lea, Minn.
Erie Mach. Shops, Erie, Pa.
J. D. Farsey Co., Cleveland, O.
Gilbert Mfg. Co., Aberdeen, S. Dak.
Glide Rd. Mch. Co., Minneapolis.
The Hag Co., Highland, Ill.
Killefer Mfg. Co., Los Angeles
Kinney Mfg. Co., Boston
Lyle Culv. & Rd. Equip. Co., Minneapolis.
N. S. Monroe & Sons, Arthur, Ill.
Shaw-Enochs Tractor Co., Minneapolis

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*



1 Bag



2 Bags

WONDER MIXERS

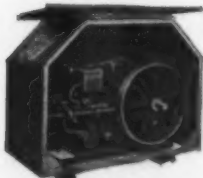
for the big jobs!

Wonder "7"

Here's one of the best all 'round sizes in the WONDER line. It has an approximate capacity of $10\frac{1}{2}$ cu. ft. of unmixed material or 7 cu. ft. of mixed concrete. It's a speedy, sturdy one-bag machine, and is guaranteed to give many years of economical and profitable mixer service. Its extreme simplicity combined with rigid construction insure low operating costs, continuous service and long life. It will speed up your work, increase your daily output, and earn more profits for you.

Wonder "10"

Popular demand for a dependable two-bag mixer produced this newest WONDER design. It has a capacity of 10 cubic feet of mixed concrete and will handle a 2 bag batch or proportions up to and including 1-2-5 mix. The "10" has all the WONDER features, many of them exclusive, such as the perfectly balanced mixing drum—a track type of loader with its extension advantages—a thrust screw type of loader clutch with an automatic knockout and Alemite lubrication.



The Fuller and Johnson engine is standard equipment on the WONDER "7". It's a horizontal, single cylinder, hopper cooled four cycle engine that will give dependable power at all times.

SEND today for complete information and new low prices on either of the two WONDERS pictured above or any size mixer you are interested in. Our complete catalog is Free for the asking. It illustrates the entire WONDER line — WONDER exclusive fundamental features and all 1926 improvements.



The two cylinder, La Roi engine is furnished with the WONDER "10". It's a light-weight, heavy-duty industrial engine, built for continuous full-load service. Guaranteed absolutely.

Construction Machinery Company

WATERLOO, IOWA, U. S. A.

Western Office
406 East 3d St., Los Angeles, Cal.

Central Office
315 W. Maryland St., Indianapolis, Ind.

Eastern Office
Widener Bldg., Philadelphia, Pa.

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Where to Purchase

29

Stockland Rd. Mch. Co., Minneapolis.
United Iron Wks., Inc., K. City, Mo.

ROCK CRUSHERS AND PULVERIZERS (See "Crushers")

ROCK DRILLS (See Drills, Rock)

ROOFING, ASPHALT, COMPOSITION, TILE, ETC.

*Barber Asphalt Co., Phila., Pa.
*Barrett Co., N. Y.
*Philip Carey Co., Cincinnati, O.
*Standard Oil Co. (Indiana), Chicago.
*Texas Co., N. Y.
Amer. Cem. Tile Mfg. Co., Pittsburgh.
Atlantic Ref. & Asph. Corp., Phila., Pa.
Beaver Prod. Co., Inc., Buffalo, N. Y.
Bird & Son, Inc., E. Walpole, Mass.
Certain-tec Products Corp., N. Y.
Chatsfield Mfg. Co., Cincinnati, O.
Edwards Mfg. Co., Cincinnati, O.
Plintkote Co., Boston.
Johns-Manville, Inc., N. Y.
Keystone Roofing Mfg. Co., York, Pa.
The Lehon Co., Chicago.
F. J. Lewis Mfg. Co., Chicago.
Nat'l Roofing Co., Tonawanda, N. Y.
Ruberoid Co., N. Y.
Sall Mountain Co., Chicago.
Sifo Prod. Co., St. Paul, Minn.
L. Sonneborn & Son, Inc., N. Y.
Western Elastite Roofing Co., Denver.

ROOFING, METAL

*Truscon Steel Co., Youngstown, O.
Amer. Rolling Mill Co., Middletown, O.
Amer. Sheet & Tin Plate Co., Pittsb'h.
Berger Mfg. Co., Canton, O.
Edwards Mfg. Co., Cincinnati, O.
Klausner Mfg. Co., Dubuque, Ia.
Milwaukee Corr. Co., Milwaukee.
Nat'l Sheet Metal Roofing Co., J. City, N. J.
United Alloy Steel Corp., Canton, O.
Youngstown Sheet & Tube Co., Youngstown, O.

ROOFING KETTLES (See Kettles)

ROPE, MANILA

Amer. Mfg. Co., B'hlyn, N. Y.
Columbian Rope Co., Auburn, N. Y.
Cuyler Cordage Co., B'hlyn, N. Y.
Hoover & Allison Co., Xenia, O.
N. A. Kelly Co., Xenia, O.
N. Bedford Cordage Co., N. Bedford, Mass.
Peoria Cordage Co., Peoria, Ill.
Plymouth Cordage Co., N. Plymouth, Mass.
Portland Cordage Co., Portland, Ore.
Tubbs Cordage Co., San Francisco.
Wall Rope Wks., N. Y.
Waterbury Co., N. Y.
Whitlock Cordage Co., N. Y.

ROPE, WIRE, HOISTING, HAULAGE

*W'msport Wire Rope Co., W'msport, Pa.
Amer. Cable Co., Inc., N. Y.
Amer. Steel & Wire Co., Chicago.
Broderick & Bascom Rope Co., St. Louis, Mo.
A. Lechen & Sons Rope Co., St. Louis, Chicago.
Fischer & Hayes Rope & Steel Co., Chicago.
Macwhyrte Co., Kenosha, Wis.
J. A. Roebing's Sons Co., Trenton, N.J.
Upson-Walton Co., Cleveland, O.
Waterbury Co., N. Y.
Wickwire Spencer Steel Co., N. Y.

RUBBER TIRES (See Tires)

RULES

*Lufkin Rule Co., Saginaw, Mich.

SALAMANDERS

*Littleford Brothers, Cincinnati, O.

SAFETY TREADS (See Treads, Safety)

SASH, ROLLER STEEL (See Window Frames and Sash)

SAW RIGS (See Portable)

*Amer. Saw Mill Mach. Co., Hackettstown, N. J.
Beach Mfg. Co., Montreal, Pa.
C. H. & E. Mfg. Co., Milwaukee.
Knickerbocker Co., Jackson, Mich.
Leach Co., Oshkosh, Wis.
Jones Superior Mach. Co., Chicago.

SCARIFIERS

*Acme Rd. Mach. Co., Frankfort, N.Y.
*Austin-West'n Rd. Mch. Co., Chicago
*Barber Asphalt Co., Phila., Pa.
*Buffalo-Springfield Roller Co., Springfield, O.
*Gallon Jr. Wks. & Mfg. Co., Gallon, O.
*Good Rd. Mach. Co., Kennett Sq., Pa.
*Huber Mfg. Co., Marion, O.
*Russell Grader Mfg. Co., Minneapolis.
*Universal Rd. Mch. Co., Kingston, N.Y.
C. D. Edwards Mfg. Co., Albert Lea, Minn.

SCARIFIERS, TEETH FOR

*Gallon Jr. Wks. & Mfg. Co., Gallon, O.
*Russell Grader Mfg. Co., Minneapolis.
Skunk Mfg. Co., Bucyrus, O.

SCRAPERS, DRAGLINE

*Jackson Mfg. Co., Harrisburg, Pa.
*Russell Grader Mfg. Co., Minneapolis
*Sauerman Bros., Chicago

SCRAPERS, POWER DRAG

*Russell Grader Mfg. Co., Minneapolis
*Sauerman Bros., Chicago

SCRAPERS, ROAD (See Road Scrapers)

SCRAPERS, SELF-LOADING

*Baker Mfg. Co., Springfield, Ill.
*Euclid Cr. & Hst. Ct., Euclid Village, O.
*Miami Trailer-Scraper Co., Troy, O.
*Russell Grader Mfg. Co., Minneapolis
Shaw-Enochs Tractor Co., Minneapolis

SCREENS, SAND, GRAVEL AND COAL

*Atlas Eng. Co., Milwaukee, Wis.
*Austin-Western Rd. Mch. Co., Chicago
*Gallon Jr. Wks. & Mfg. Co., Gallon, O.
*Good Roads Mch. Co., Kennett Sq., Pa.
*Haiss Mfg. Co., N. Y.
*Littleford Bros., Cincinnati, O.
*Russell Grader Mfg. Co., Minneapolis
*Universal Rd. Mach. Co., Kingston, N.Y.
Allis-Chalmers Mfg. Co., Milwaukee
Austin Mfg. Co., Chicago
Brown Hstg. Machy. Co., Cleveland, O.
C. O. Bartlett & Snow Co., Cleveland, O.
J. I. Case Threshing Mach. Co., Racine, Wis.
Chain Belt Co., Milwaukee, Wis.
Gifford-Wood Co., Hudson, N. Y.
Hendrick Mfg. Co., Carbondale, Pa.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Chicago
Lyle Culv. & Rd. Equip. Co., Minneapolis, Minn.
Morrow Mfg. Co., Wellston, O.
Newaygo Eng. Co., Newaygo, Mich.
New Jersey Wire Cloth Co., Trenton, N. J.
Robbins Conv. Belt Co., N. Y.
H. B. Sackett Screen & Chute Co., Chicago
Webster Mfg. Co., Chicago
Weller Mfg. Co., Chicago
Wickwire Spencer Steel Co., N. Y.

SCREENS, SEWAGE

Dorr Co., New York
Green Bay Fdry. & Mach. Wks., Green Bay, Wis.
Link-Belt Co., Philadelphia.
Sanitation Corp'n., N. Y.
Simplex Ejector Co., Chicago.

SEWAGE DISPOSAL APPARATUS

*Pacific Flash Tank Co., Chicago & N. Y.
Dorr Co., N. Y.
Sanitation Corp'n., N. Y.
Simplex Ejector Co., Chicago.

SEWAGE PUMPS (See Pumps)

SEWAGE EJECTORS

*Pacific Flash Tank Co., Chicago & N. Y.
Sanitation Corp., N. Y.
Simplex Ejector Co., Chicago.
Yeomans Bros. Co., Chicago.

SEWER BLOCKS, SEGMENT

American Vit. Products Co., Akron, O.
Cannelton Sewer Pipe Co., Cannelton, Ind.
Denver Sewer Pipe & Clay Co., Denver, Col.
W. S. Dickey Clay Mfg. Co., Kansas City, Mo.
Evans & Howard Fire Brick Co., St. Louis, Mo.
Laclede Christy Clay Prod. Co., St. Louis, Mo.
Macomb Sewer Pipe Wks., Macomb, Ill.
Pacific Clay Prod. Co., L. Angeles, Cal.
Red Wing Sewer Pipe Co., Red Wing, Minn.
Robinson Clay Prod. Co., Akron, O.
Standard Fire Brick & Sewer Pipe Co., Pueblo, Col.

SEWER CLEANING APPARATUS

F. Bissell Co., Toledo, O.
Champion Corp., Hammond, Ind.
Self Propelling Nozzle Co., N. Y.
Turbine Sewer Mach. Co., Milwaukee.

SEWER PIPE AND DRAIN TILE

American Vit. Prod. Co., Akron, O.
Blackmer & Post Pipe Co., St. Louis
Wm. E. Dee Co., Chicago.
Denver Sewer Pipe & Clay Co., Denver, Col.
W. S. Dickey Clay Mfg. Co., K. City, Mo.
Logan Clay Prod. Co., Logan, O.
Ohio Vit. Pipe Co., Uhrichsville, O.
Robinson Clay Prod. Co., Akron, O.

SEWER PIPE FORMS

*Raber & Lang Mfg. Co., Kendallville, Ind.
Quinn Wire & Iron Wks., Boone, Ia.

SEWER PIPE JOINT COMPOUNDS

G. K. Sales Agency, Macungie, Pa.
Ruberoid Co., N. Y.
Servicised Prod. Corp., Chicago

SEWER RODS

F. Bissell Co., Toledo, O.
Champion Corp., Hammond, Ind.
P. J. Healy, Jersey City, N. J.
Lack Sewer Equip. Co., Chicago
Turbine Sewer Mach. Co., Milwaukee

SHINGLES, METAL

Aluminum Co. of Am., Pittsburgh, Pa.
Berger Mfg. Co., Canton, O.
Canton Art Metal Co., Canton, O.
Edwards Mfg. Co., Cincinnati, O.
Klausner Mfg. Co., Dubuque, Ia.
Milwaukee Corrugating Co., Milwaukee.
Nat'l Sheet Metal Roofing Co., Jersey City, N. J.
Newport Rolling Mill Co., Newport, Ky.
Penn Metal Co., Boston.
Tiffin Art Metal Co., Tiffin, O.
Wheeling Metal Mfg. Co., Wheeling, W. Va.

SHORES

*M. & M. Wire Clamp Co., Minneapolis
Dayton Sure Grip & Shore Co., Dayton, O.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*



No. 1 of a Series

*Smith Paver on street work, owned by
Regan-Towers Co., New York City*

If You Lost an Arm—

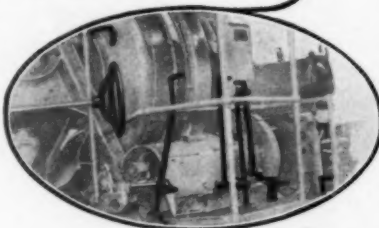
Could you still get full capacity out of your paver? This unusual feat actually has been accomplished because of this—

By actual count there are fewer control levers on the Smith than on any other paver—all within easy arm's reach of the operator which makes for simplicity of handling and continuous speedy operation.

The controls are located so that both charging and spreading crews are always

in sight. Divided between the hands and feet, they make operating less tiring, and because two operations at once are thus possible, many seconds are saved.

The simple "one-man control" of the Smith Paver is but one of the reasons for its popularity. Its many other outstanding features are described in Catalog 409-F. Send for a copy today.



The T. L. SMITH COMPANY
1030 32nd Street, Milwaukee, Wis.

Sales Offices and Service Stations in all Principal Cities



Smith Tilting Mixers are built in the following sizes: 2½, 3½, 5, 7, 10, 14, 21, 28, 40, 56 and 112 cu. ft. per batch; Smith Non-Tilting Mixers: 7, 14, 21 and 28 cu. ft. per batch; Smith Paving Mixers: 27-E.

SMITH 27-E PAYER

SIX BAG

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you,

Where to Purchase

31

The O. D. G. Co., Owensboro, Ky.
H. W. Ross Co., Cincinnati, O.
Roes-Mayer-Hoch Co., Cincinnati, O.
Symons Clamp & Mfg. Co., Chicago.
Universal Form Clamp Co., Chicago.

SHOVELS, ELECTRIC

*Bay City Dredge Wks., Bay City, Mich.
*Byers Mach. Co., Ravenna, O.
*Koehring Co., Milwaukee, Wis.
*Marion Steam Shovel Co., Marion, O.
*Bucyrus Co., So. Milwaukee, Wis.
*Osgood Co., Marion, O.
*Thew Shovel Co., Lorain, O.

SHOVELS, GASOLINE

*Bay City Dredge Wks., Bay City, Mich.
*Byers Mach. Co., Ravenna, O.
*Harnischfeger Corp., Milwaukee, Wis.
*Koehring Co., Milwaukee, Wis.
*Marion Steam Shovel Co., Marion, O.
*Orton Crane & Shovel Co., Chicago
Amer. Steel Dredge Co., Ft. Wayne, Ind.
Austin Mach. Corp., Muskegon, Mich.
Brown Htg. Machy. Co., Cleveland, O.
Bucyrus Co., So. Milwaukee, Wis.
Erie Steam Shovel Co., Marion, O.
McMyler Interstate Co., Cleveland, O.
Osgood Co., Marion, O.
Speeder Machy. Corp., Fairfield, Ia.
Thew Shovel Co., Lorain, O.

SHOVELS, HAND

Ames Shovel & Tool Co., Boston.
Beall Bros. Co., Alton, Ill.
Connant Shovel Co., Connant, O.
Hubbard & Co., Pittsburgh, Pa.
Indiana Shovel Co., New Castle, Ind.
Jackson Shovel Co., Montpelier, Ind.
Pittsburgh Shovel Co., Pittsburgh, Pa.
Russell Shovel Co., Aliquippa, Pa.
Stevens-Webb Co., Inc., Altoona, Pa.
Union Furnace Mfg. Co., Altoona, Pa.
Wood Shovel & Tool Co., Piqua, O.
Wyoming Shovel Wks., Wyoming, Pa.

SHOVELS, STEAM

*Byers Mach. Co., Ravenna, O.
*Erie Steam Shovel Co., Erie, Pa.
*Keystone Driller Co., Beaver Falls, Pa.
*Marion Steam Shovel Co., Marion, O.
*Orton Crane & Shovel Co., Chicago
Austin Mach. Corp., Muskegon, Mich.
Bellwood Stm. Shovel Co., Bellwood, Pa.
Bucyrus Co., So. Milwaukee, Wis.
Industrial Wks., Bay City, Mich.
Osgood Co., Marion, O.
Russell & Co., Massillon, O.
Thew Shovel Co., Lorain, O.

SIGNS, STREET AND ROAD

Auto Sign Display Co. of Mo., St. Louis, Mo.
Automatic Signal & Sign Co., Chicago.
Baltimore Enam. & Nov. Co., Baltimore.
Cavanagh Bros. & Co., N. Y.
Elkhart Fdry. & Mach. Co., Elkhart, Ind.
Evernu-Century Sign Co., Boston.
Ingram-Richardson Mfg. Co., Beaver Falls, Pa.
Lyle-Signs, Minneapolis, Minn.
Municipal Street Sign Co., N. Y.
Rochester St. Signal Co., Rochester, N.Y.
Standard Mfg. Co., Cedar Falls, Ia.
Union Iron Prod. Co., E. Chicago, Ind.
Western Display & Mfg. Co., St. Paul.

SIGNS, TRAFFIC

*Highway Traffic Co., Edgerton, Wis.
Acme Traffic Signal Co., Los Angeles.
Adams & Westlake, Chicago.
Auto Sign Display Co. of Mo., St. Louis, Mo.
Automatic Signal & Sign Co., Chicago.
Automatic Signal & Sign Co., Canton, O.
Amer. Gas Accumulator Co., Elizabeth, N. J.
Crouse-Hinds Co., Syracuse, N. Y.
Elkhart Fdry. & Mach. Co., Elkhart, Ind.
Esco Mfg. Co., Peoria, Ill.

Evernu-Century Sign Co., Boston.
Griswold Safety Signal Co., Minneapolis.
Hornal Signal Mfg. Corp., Newark, N. J.
Klug & Smith Co., Milwaukee, Wis.
Line Material Co., So. Milwaukee, Wis.
Little Giant Co., Mankato, Minn.
Lyle-Signs, Minneapolis, Minn.
Nat'l. Traffic Signal Corp., Chicago.
Ohio Traffic Devices Co., Columbus, O.
Rochester St. Signal Co., Rochester, N.Y.
Tobheim Oil Tank & Pump Co., Ft. Wayne, Ind.
Traffic Sign & Signal Co., Gloucester, Mass.
Traffic Signal Corp., N. Y.
Union Iron Prod. Co., E. Chicago, Ind.
Universal Traffic Control Co., Oklahoma City, Okla.

SLATE, ROOFING

Vendor Slate Co., Inc., Easton, Pa.

SLATE, STRUCTURAL

Keenan Struct. Slate Co., Bangor, Pa.
Penna. Struct. Slate Co., Easton, Pa.
Phoenix Slate Co., Windgap, Pa.
Stephens-Jackson Co., Pen Argyl, Pa.
Structural Slate Co., Pen Argyl, Pa.

SLEEVES, TAPPING AND VALVE

Mueller Company, Decatur, Ill.
Rensselaer Valve Co., Troy, N. Y.
A. P. Smith Mfg. Co., East Orange, N. J.

SLUICE GATES (See Gates, Sluice)

SNOKE STACKS (See Stacks, Steel)

SNOW CLEANING MACHINERY

*Austin-Western Rd. Machy. Co., Chicago.
*Baker Mfg. Co., Springfield, Ill.
*Barber-Greene Co., Aurora, Ill.
*Caterpillar Tractor Co., San Leandro, Calif. and Peoria, Ill.
*Cleveland Tractor Co., Cleveland, O.
*Gallon Iron Wks. & Mfg. Co., Gallon, O.
*Good Eds. Mach. Co., Kennett Sq., Pa.
*La Plant-Chouteau Mfg. Co., Cedar Rapids, Ia.

*Mack Trucks, Inc., N. Y.
*Mead-Morrison Mfg. Co., E. Boston.
*Russell Grader Mfg. Co., Minneapolis.
C. D. Edwards Mfg. Co., Albert Lea, Minn.
Hiway Service Corp., Wasau, Wis.
Killefer Mfg. Co., Los Angeles, Cal.
Monarch Tractors Corp., Springfield, Ill.
Owensboro Ditcher & Grader Co., Owensboro, Ky.
Rotary Snow Plow Co., Minneapolis.
Shaw-Enoch Tractor Co., Minneapolis.
W. M. Toy Co., Sidney, O.
Union Iron Wks., Inc., Bangor, Me.
Walsh Holyoke St. Bldg. Wks., Holyoke, Mass.

SNOW FENCING (See Fencing)

SPADES (See Shovels)

SPRAYERS, ASPHALT AND TAR

*Kinney Mfg. Co., Boston.

SPRAYING MACHINERY FOR TREES

Bean Spray Pump Co., Lansing, Mich.
Field Force Pump Co., Elmira, N. Y.
Fitzhenry-Guptill Co., E. Cambridge, Mass.

SNOW FENCING (See Fencing)

SPREADERS, STONE

*Austin-Western Rd. Machy. Co., Chicago.
*Burch Plow Wks. Co., Crestline, O.
*Gallon Ir. Wks. & Mfg. Co., Gallon, O.
*Shaw-Enoch Tractor Co., Minneapolis

STACKS, STEEL

*Blaw-Knox Co., Pittsburgh, Pa.
*Connery & Co., Inc., Philadelphia.
*Hell Co., Milwaukee, Wis.
*Jos. Honhorst Co., Cincinnati, O.
*Littlefield Bros., Cincinnati, O.
*N. Y. Central Iron Wks. Co., Inc., Hagerstown, Md.

Birmingham Tank Co., Birmingham, Ala.
Chatt. Boiler & Tank Co., Chatta., Tenn.
Chicago Bridge & Iron Wks., Chicago.
Graver Corp., Chicago.
Petroleum Iron Wks. Co., Sharon, Pa.
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
W. B. Scaife & Sons Co., Pittsburgh, Pa.
Walsh & Weldner Boiler Co., Chatta-nooga, Tenn.

STANDPIPES, TANKS AND TOWERS

*Connery & Co., Inc., Philadelphia.
*N. Y. Central Iron Wks. Co., Inc., Hagerstown, Md.
W. E. Caldwell Co., Louisville, Ky.
Chatta. Bldg. & Tank Co., Chatta., Tenn.
Chicago Bridge & Iron Wks., Chicago.
Lancaster Iron Wks., Lancaster, Pa.
Pacific Tank & Pipe Co., San Francisco.
Petroleum Ir. Wks. Co., Sharon, Pa.
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
United Iron Wks., Inc., K. City, Mo.
Walsh & Weldner Boiler Co., Chatta-nooga, Tenn.

STEAM SHOVELS (See Shovels, Steam)

STEAM TURBINES (See Turbines)

STEEL PLATE CONSTRUCTION

*Blaw-Knox Co., Pittsburgh, Pa.
*Connery & Co., Philadelphia.
*Hell Co., Milwaukee, Wis.
*Helselt St. Form & Ir. Co., Warren, O.
*Jos. Honhorst Co., Cincinnati, O.
*Littlefield Bros., Cincinnati, O.
*N. Y. Central Iron Wks. Co., Inc., Hagerstown, Md.
*Union Iron Wks., Inc., Hoboken, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
Biggs Boiler Wks., Akron, O.
Birmingham Tank Co., Birmingham, Ala.
Chatta. Boiler & Tank Co., Chatta., Tenn.
Chicago Bridge & Iron Wks., Chicago.
Graver Corp., E. Chicago, Ind.
Hendrick Mfg. Co., Carbondale, Pa.
*McClintic-Marshall Co., Pittsburgh, Pa.
Penna. Bridge Co., Beaver Falls, Pa.
Petroleum Iron Wks. Co., Sharon, Pa.
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
Ritter-Conley Co., Pittsburgh, Pa.
W. B. Scaife & Sons, Pittsburgh, Pa.
Toledo Crane Co., Toledo, O.
Walsh & Weldner Bldg. Co., Chatta., Tenn.

STOKERS, MECHANICAL

Automatic Furnace Co., Dayton, O.
Babcock & Wilcox Co., N. Y.
Combustion Engineering Corp., N. Y.
Detroit Stoker Co., Detroit.
Sanford Riley Stoker Co., Worcester, Mass.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

STREET AND ROAD SIGNS (See Signs)

STREET CLEANERS CARTS

Durlach Can & Iron Wks., B'lyn, N. Y.
Rochester Can Co., Rochester, N. Y.
Tarrant Mfg. Co., Saratoga Springs, N.Y.

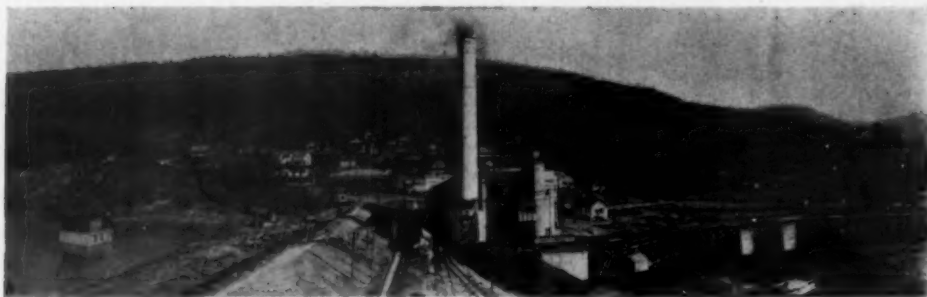
STREET FLUSHERS AND SPRINKLERS

*Austin-Western Rd. Machy. Co., Chicago.
*Gallon Ir. Wks. & Mfg. Co., Gallon, O.
*General Motors Trk. Co., Detroit, Mich.
*Hell Co., Milwaukee, Wis.
*Mack Trucks, Inc., N. Y.
Autocar Co., Ardmore, Pa.
E. D. Emyre & Co., Oregon, Ill.
Federal Motor Truck Co., Detroit.
Chas. Evans & Co., N. Y.
Kinney Mfg. Co., Boston.
Municipal Supply Co., So. Bend, Ind.
White Co., Cleveland, O.

STREET LAMP POSTS

*Novo Engine Co., Lansing, Mich.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*



STREET Cableway at Hales Bar station, Tenn. Electric Power Co.

Moving Coal at 1,200 Feet per Minute!

AT the Hales Bar station of the Tennessee Electric Power Company, this STREET Cableway is indispensable for rapid coaling.

It unloads barges, carries the fuel to hopper, or to stock pile and then reclaims. Travels safely and easily at a speed of over 1,200 feet per minute.

Unusually high speeds are made possible by the patented STREET carriage. It distributes the fall rope carriers and picks them up entirely without the aid of buttons, lugs or spacing chains.

Our Engineering Department will plot pathways and make complete recommendations for cableways for any purpose. Describe your project and we'll gladly make suggestions.

WRITE TODAY!

STREET CABLEWAYS

STREET BROS. MACHINE WORKS
Makers of Hoists, Derricks, Etc. **CHATTANOOGA, TENN.**

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Where to Purchase

33

- American Conc. Prod. Co., Chicago.
Chicago Conc. Post Co., Chicago.
J. B. Clow & Sons, Chicago.
Electric Ry. Equip. Co., Cincinnati, O.
King Mfg. Co., Chicago.
Union Metal Mfg. Co., Canton, O.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
- STREET SIGNS (See Signs, Street)**
- STREET SWEEPERS**
*Austin-Western Rd. Mch. Co., Chicago.
*Good Eds. Mach. Co., Kennett Sq., Pa.
Butler Mfg. Co., Cleveland, O.
Elgin Sales Corp., N. Y.
Foamite-Childs Corp., Utica, N. Y.
Kinney Mfg. Co., Boston
- STREET SWEEPING BROOMS**
*Littleford Bros., Cincinnati, O.
J. I. Holcomb Mfg. Co., Indianapolis, Ind.
Brush & Broom Mfg. Co., Indianapolis, Ind.
Kendallville Broom & Brush Co., Kendallville, Ind.
Lang Broom Co., Pittsburgh, Pa.
Jos. Lay Co., Ridgeville, Ind.
Milwaukee Brush Mfg. Co., Milwaukee, O.
Osborn Mfg. Co., Cleveland, O.
- STREET BROOMS REPILED**
Kendallville Broom & Brush Co., Kendallville, Ind.
Lang Broom Co., Pittsburgh, Pa.
Osborn Mfg. Co., Cleveland, O.
- STUMP PULLERS**
*Clyde Ir. Wks. Sales Co., Duluth, Minn.
*La Plant-Chaste Mfg. Co., Cedar Rapids, Ia.
Ersted Machy. Mfg. Co., Portland, Ore.
H. L. Bennett & Co., Westerville, O.
Thomas Elevator Co., Chicago.
John Waldron Corp., New Brunswick, N. J.
- SUBGRADING MACHINES**
*Lakewood Eng. Co., Cleveland, O.
The Hug Co., Highland, Ill.
Shaw-Enoch Tractor Co., Minneapolis
- SUPERHEATERS**
Babcock & Wilcox Co., N. Y.
Power Specialty Co., N. Y.
Superheater Co., N. Y.
- SURVEYOR'S INSTRUMENTS (See Instruments)**
- SWITCHBOARDS**
Allis-Chalmers Mfg. Co., Milwaukee.
General Elec. Co., Schenectady, N. Y.
Wagner Elec. Mfg. Co., St. Louis, Mo.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
- TAMPING MACHINES**
*Harnischfeger Corp., Milwaukee, Wis.
*Ingersoll-Rand Co., N. Y.
Chicago Pneum. Tool Co., New York
- TANKS, AIR COMPRESSOR**
*Connery & Co., Inc., Philadelphia.
*Curtis Pneum. Mch. Co., St. Louis, Mo.
*Hell Co., Milwaukee, Wis.
*Ingersoll-Rand Co., N. Y.
*Littleford Bros., Cincinnati, O.
Andrews & Root Mfg. Co., N. Y.
Biggs Boiler Wks., Akron, O.
Birmingham Tank Co., Birmingham, Ala.
Chicago Bridge & Iron Wks., Chicago.
Chicago Pneum. Tool Co., N. Y.
Graver Corp., E. Chicago, Ind.
Indiana Air Pump Co., Indianapolis.
Lancaster Iron Wks., Lancaster, Pa.
National Tube Co., Pittsburgh, Pa.
Petroleum Iron Wks. Co., Sharon, Pa.
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
W. B. Seafie & Sons Co., Pittsburgh, Pa.
Westinghouse Tract. Brake Co., Wilmerding, Pa.
Worthington Pump & Machy. Corp., N. Y.
- TANKS, STEEL**
*Connery & Co., Philadelphia.
- *Hell Co., Milwaukee, Wis.
*Jos. Honhorst Co., Cincinnati, O.
*Littleford Bros., Cincinnati, O.
*N. Y. Central Iron Wks. Co., Hagers-town, Md.
Biggs Boiler Wks., Akron, O.
Birmingham Tank Co., Birmingham, Ala.
S. F. Bowser & Co., Inc., Ft. Wayne, Ind.
J. I. Case Threshing Mach. Co., Racine, Wis.
W. E. Caldwell Co., Louisville, Ky.
Chatta. Boiler & Tank Co., Chattanooga, Tenn.
Chicago Bridge & Iron Wks., Chicago.
Columbian St. Tank Co., K. City, Mo.
Dover Boiler Wks., N. Y.
Farrell Mfg. Co., Joliet, Ill.
C. C. Fouts Co., Middletown, O.
Graver Corp., E. Chicago, Ind.
R. Hardesty Mfg. Co., Denver, Col.
Hendrick Mfg. Co., Carbondale, Pa.
Lancaster Iron Wks., Lancaster, Pa.
Pacific Tank & Pipe Co., San Francisco.
Petroleum Iron Wks. Co., Sharon, Pa.
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
Ritter-Conley Co., Pittsburgh, Pa.
W. B. Seafie & Sons, Oakmont, Pa.
United Iron Wks., Inc., K. City, Mo.
Walsh & Weldner Boiler Co., Chattanooga, Tenn.
Wayne Tank & Pump Co., Ft. Wayne, Ind.
- TANKS, WOOD**
W. E. Caldwell Co., Louisville, Ky.
G. M. Davis & Son, Palatka, Fla.
Eagle Tank Co., Chicago.
Hauser-Stander Tank Co., Cincinnati, O.
Kalamazoo Tank & Silo Co., Kalamazoo, Mich.
Nat'l Tank & Pipe Co., Portland, Ore.
Pacific Tank & Pipe Co., San Francisco.
Redwood Mfrs. Co., San Francisco.
A. T. Stearns Lumber Co., Boston.
U. S. Wind Eng. & Pump Co., Batavia, Ill.
Wendnagel & Co., Chicago.
- TANK WAGONS**
*Acme Ed. Mach. Co., Frankfort, N. Y.
*Gallon Ir. Wks. & Mfg. Co., Gallon, O.
*Hell Co., Milwaukee, Wis.
*Mack Trucks, Inc., N. Y.
Butler Mfg. Co., Minneapolis, Minn.
J. I. Case Threshing Mach. Co., Racine, Wis.
- TAPES, STEEL AND METALLIC**
*Lufkin Rule Co., Saginaw, Mich.
Eugene Dietgen Co., N. Y.
Keuffel & Esser Co., Hoboken, N. J.
L. S. Starrett Co., Athol, Mass.
- TAR**
*Barrett Co., N. Y.
Amer. Tar Prod. Co., Pittsburgh, Pa.
- TAR KETTLES (See Kettles)**
- THAWING OUTFITS**
*Acroll Burner Co., Union Hill, N. J.
*Hawck Mfg. Co., Bklyn, N. Y.
- TIE TAMPERS**
Electric Tamper & Equip. Co., Chicago
- TIE BOLTS FOR WALL FORMS**
*Hawley Tie Bolt Co., Minneapolis
- TIES, STEEL**
Carnegie Steel Co., Pittsburgh, Pa.
Int'l Steel Tie Co., Cleveland, O.
Koppel Ind. Car & Equip. Co., Koppel, Pa.
Sweet's Steel Co., Williamsport, Pa.
- TIMBER CLAMPS**
Pyle-Rogers Corp., N. Y.
- TIRES, RUBBER (For Motor Trucks)**
Firestone Tire & Rubber Co., Akron, O.
Fisk Tire Co., Chicopee Falls, Mass.
Goodrich Rubber Co., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Kelly Springfield Tire Co., N. Y.
U. S. Tire Co., N. Y.
- TOOL HOUSES, PORTABLE STEEL**
*Blaw-Knox Co., Pittsburgh, Pa.
*Littleford Bros., Cincinnati, O.
- TORCHES, OIL (HEATING)**
*Chausse Oil Burner Co., Elkhart, Ind.
*Hawck Mfg. Co., Bklyn, N. Y.
*Mead-Morrison Mfg. Co., E. Boston.
*Alex. Milburn Co., Baltimore, Md.
- TOWERS (See Standpipe, Tanks and Towers)**
- TRACKS, INDUSTRIAL AND PORTABLE**
*Easton Car & Constn. Co., Easton, Pa.
*Lakewood Eng. Co., Cleveland, O.
Atlas Car & Mfg. Co., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Chase Fdry. & Mfg. Co., Columbus, O.
C. W. Hunt Co., Inc., W.N. Brighton, N.Y.
Koppel Ind. Car & Equip. Co., Koppel, Pa.
Sweet's Steel Co., Williamsport, Pa.
- TRACTORS**
*Caterpillar Tractor Co., San Leandro, Calif.
*Cleveland Tractor Co., Cleveland, O.
*Ford Motor Co., Detroit, Mich.
*Geo. Hais Mfg. Co., New York
*Huber Mfg. Co., Marion, O.
*John Lauson Co., New Holstein, Wis.
*Mack Trucks, Inc., N. Y.
*Mead-Morrison Mfg. Co., E. Boston.
Advance-Rumely Thresher Co., Laporte, Ind.
Allis-Chalmers Mfg. Co., Milwaukee
Bates Mach. & Tractor Co., Joliet, Ill.
Clark Tractor Co., Buchanan, Mich.
Emerson-Brantingham, Rockford, Ill.
Hart-Parr Co., Charles City, Ia.
Int'l Harvester Co., Chicago.
J. T. Tractor Co., Cleveland, O.
Kinnard & Haines, Minneapolis, Minn.
The Minneapolis Line, Minneapolis.
Monarch Tractors Corp., Springfield, Ill.
Shaw-Enoch Tractor Co., Minneapolis
Twin City Co., Minneapolis, Minn.
- TRAFFIC LINE MARKERS**
Carrara Paint Co., Cleveland, O.
Continental Prod. Co., Euclid, O.
Line-O-Graph Co., N. Y.
Tenn. Tool Wks., Inc., Knoxville, Tenn.
- TRAFFIC PAINT**
Carrara Paint Co., Cleveland, O.
Continental Prod. Co., Euclid, O.
Hanline Bros., Baltimore, Md.
Hoosier Paint Wks., Ft. Wayne, Ind.
Sewall Paint & Glass Co., K. City, Mo.
Sherwin-Williams Co., Cleveland, O.
Tropical Paint & Oil Co., Cleveland, O.
Truscon Laboratories, Detroit, Mich.
Wamblin Paint & Varnish Works, Rochester, N. Y.
- TRAFFIC SIGNS (See "Signs, Traffic")**
- TRAILERS FOR TRUCKS AND TRACTORS**
*Eagle Wagon Wks., Auburn, N. Y.
*La Plant-Chaste Mfg. Co., Cedar Rapids, Ia.
*Highway Trailer Co., Edgerton, Wis.
*Miami Trailer-Scraper Co., Troy, O.
*Watson Truck Corp., Canastota, N. Y.
Arcadia Trailer Corp., Newark, N. Y.
Detroit Trailer & Mach. Co., Detroit.
Freuhauf Trailer Co., Detroit, Mich.
Hercules Trailer Mfg. Co., Los Angeles
Lee Trailer & Body Co., Chicago.
Scully-Rix Co., Milwaukee, Wis.
Troy Wagon Wks., Troy, O.
Warner Mfg. Co., Beloit, Wis.
Whitehead & Kales Co., Detroit, Mich.
- TRAILERS, INDUSTRIAL**
*Lakewood Eng. Co., Cleveland, O.
*La Plant-Chaste Mfg. Co., Cedar Rapids, Ia.
Chase Fdry. & Mfg. Co., Columbus, O.
Detroit Trailer & Mach. Co., Detroit.
Electric Wheel Co., Quincy, Ill.

Indicates that the manufacturer carries an advertisement. See index facing inside back cover.



Pioneers

Pioneers lead. Others follow—when possible. McKiernan-Terry Hammers were pioneers in

- (1) The double acting *principle*, in which the ram is not only lifted by steam, but is also driven *downward by steam* (plus gravity).
- (2) The idea of *pile pulling*, on rigging the hammer *reversed* and getting the sheeting out in perfect condition.
- (3) The idea of submarine pile driving, in which the hammer drives completely submerged, with on-the-surface efficiency.

McKiernan-Terry *pioneering* in the development of new ideas has made possible modern successful piling and sheeting work.

Bulletin 35 shows how and why.

McKIERNAN-TERRY DRILL COMPANY

Pile Hammers—Lifting Jacks

19 PARK ROW, NEW YORK Works at Dover, N. J.

Agencies in the following cities:

Boston, Chicago, Pittsburgh, Cleveland, Detroit, St. Paul, San Francisco, Columbus, O., New Orleans, Philadelphia, Portland, Ore., Jacksonville, Fla., Houston, Texas, Los Angeles, Calif.

Foreign Representatives: British Steel Piling Co., London, England



McKIERNAN-TERRY

The Pioneer Double-Acting Pile Hammers

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

EXPOSITION

FORD POWER

EQUIPMENT



—150 exhibits—

Air Compressors
Road Rollers
Road Graders
Trailers
Crawlers
Loaders
Snow Plows

—80 manufacturers—

Contractors' Dump Bodies
Shovels
Scoops
Hoists
Back Fillers
Locomotives
Cranes

Coming to New York some time this year? Be sure to drop in at the Ford Motor Building—54th Street at Broadway—and see the biggest permanent exposition of contractors' machinery in the world—all of it incorporating the Fordson Tractor or Ford One-Ton Truck, the most efficient and economical power plants the world has ever known.

If you cannot visit the Exposition this year, the Exposition service will reach out to you. This service is available without charge to any Engineer, Contractor or Municipality. Just write us for information on any of this Ford-powered equipment, and our Engineers will gladly assist you in solving your power problems.

POWER EQUIPMENT EXPOSITION

FORD MOTOR BLDG.

54th ST. AT BROADWAY, NEW YORK CITY

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

*Write for new
Catalog and Prices*

A Wheel Barrow Proposition
which recognizes and provides for
**All the Needs of the
Equipment Distributor**

- 1. Protection** A settled policy of Jobber Protection proved by past performance. — Ask any Akron Distributor.
- 2. Increased Sales—a new line of barrows** An entirely new, interchangeable line — improved from top to bottom—and most emphatically endorsed by every contractor and distributor who has seen it.
- 3. Prices** New prices that will enable the Akron Distributor to get the business.
- 4. Terms** A credit policy which recognizes the financial problems of the distributor.
- 5. Deliveries** Complete stocks at the factory and immediate deliveries.
- 6. Co-operation** Sales co-operation by factory representatives. Complete and continuous advertising.

THE AKRON BARROW COMPANY
3140 East 65th St., CLEVELAND, OHIO



When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Where to Purchase

37

Lee Trailer & Body Co., Chicago.
Whitehead & Kales, Detroit, Mich.

TRAWAYS, AERIAL WIRE ROPE
*Street Bros. Mach. Wks., Chattanooga
Broderick & Bascom Rope Co., St. Louis, Mo.
A. Leschen & Sons Rope Co., St. Louis.

TRANSFORMERS
Allis-Chalmers Mfg. Co., Milwaukee.
Duncan Elec. Mfg. Co., Lafayette, Ind.
Enterprise Elec. Co., Warren, O.
General Elec. Co., Schenectady, N. Y.
Kuhlman Elec. Co., Bay City, Mich.
Maloney Elec. Co., St. Louis, Mo.
Packard Elec. Co., Warren, O.
Pittsburgh Transf. Co., Pittsburgh, Pa.
Wagner Elec. Corp., St. Louis, Mo.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

TRANSITS AND LEVELS (See Instruments)

TRANSMISSION (Auxiliary for Fords)
*Fuller & Sons Mfg. Co., Kalamazoo, Mich.
*Hinkley Motors, Inc., Detroit
Lincoln Mfg. Co., Connerville, Ind.
Ruckstall Sales & Mfg. Co., N. Y.
Warford Corp., N. Y.

TRANSMISSION MACHINERY, POWER
Allis-Chalmers Mfg. Co., Milwaukee.
Chain Belt Co., Milwaukee, Wis.
Dodge Mfg. Corp., Mishawaka, Ind.
Link-Belt Co., Chicago.
Webster Mfg. Co., Chicago.
Weller Mfg. Co., Chicago.

TRASH CANS (See Cans)

TREADS, SAFETY
Amer. Abrasive Metals Co., N. Y.
Amer. Mason Safety Tread Co., Lowell, Mass.
Concrete Steel Co., N. Y.
Norton Co., Worcester, Mass.

FRENCH EXCAVATORS (See Excavators)

TRENCH PUMPS (See Pumps, Contractors)

TURBINES
*Ingersoll-Rand Co., N. Y.
Allis-Chalmers Mfg. Co., Milwaukee.
De Laval Steam Turbine Co., Trenton, N. J.
General Elec. Co., Schenectady, N. Y.
Terry Steam Turb. Co., Hartford, Ct.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

TURNABLES FOR MOTOR TRUCKS
*Blaw-Knox Co., Pittsburgh, Pa.
*Easton Car & Const. Co., Easton, Pa.
Champion Eng. Co., Kenton, O.
Freeman Mfg. Co., Racine, Wis.
Hug Co., Highland, Ill.
Western Structural Co., Moline, Ill.

VALVES, ACID RESISTING
*Barber Asphalt Co., Philadelphia

VALVES, CHECK
Chapman Valve Mfg. Co., Indian Orchard, Mass.
Coffin Valve Co., Boston.
Ludlow Valve Mfg. Co., Troy, N. Y.
Mich. Valve & Fdry. Co., Detroit.
Rensselaer Valve Co., Troy, N. Y.

VALVES, GATE AND INDICATOR
POSTS
Chapman Valve Mfg. Co., Indian Orchard, Mass.
Coffin Valve Co., Boston.
Columbian Ir. Wks., Chattanooga, Tenn.
Crane Company, Chicago.
Darling Valve & Mfg. Co., Williamsport, Pa.

Eddy Valve Co., Waterford, N. Y.
Fairbanks Co., N. Y.
Iowa Valve Co., Oskaloosa, Ia.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Ludlow Valve Mfg. Co., Troy, N. Y.
Rensselaer Valve Co., Troy, N. Y.
A. P. Smith Mfg. Co., E. Orange, N. J.
R. D. Wood & Co., Philadelphia.

VALVES, PRESSURE SEATED
Cleveland Pneum. Tool Co., Cleveland, Ohio.

VALVE BOXES AND HOUSINGS
*U. S. Cast Iron Pipe & Fdry. Co., Burlington, N. J.
Central Fdry. Co., N. Y.
Chapman Valve Mfg. Co., Indian Orchard, Mass.
H. W. Clark Co., Mattoon, Ill.
J. B. Clow & Sons, Chicago.
Columbian Ir. Wks., Chattanooga, Tenn.
Darling Valve & Mfg. Co., Williamsport, Pa.
Eddy Valve Co., Waterford, N. Y.
Fairbanks Co., N. Y.
Iowa Valve Co., Oskaloosa, Ia.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Ludlow Valve Mfg. Co., Troy, N. Y.
H. Mueller Mfg. Co., Decatur, Ill.
Rensselaer Valve Co., Troy, N. Y.
A. P. Smith Mfg. Co., E. Orange, N. J.
R. D. Wood & Co., Philadelphia

WAGONS (See Dump Carts and Wagons)

WAGON BODIES (See Dump Bodies)

WAGON LOADERS (See Loaders, Gravel and Wagon)

WALLBOARD
Beaver Prod. Co., Inc., Buffalo, N. Y.
Bird & Son, Inc., E. Walpole, Mass.
Cornell Wood Prod. Co., Chicago.
Haverhill Box Board Co., Haverhill, Mass.
MacAndrews & Forbes Co., N. Y.
Plastergon Wall Board Co., Buffalo, N. Y.
U. S. Gypsum Co., Chicago.
Upson Co., Lockport, N. Y.
Waldorf Paper Prod. Co., St. Paul, Minn.

WALL TIES
Concrete Steel Co., N. Y.
Consolidated Exp. Metal Co., Brad-dock, Pa.
Berger Mfg. Co., Canton, O.
Milwaukee Corr. Co., Milwaukee, Wis.
Niagara Metal Stamp. Corp., Niagara Falls, N. Y.

WATER MAIN CLEANING
Nat'l Water Main Cleaning Co., N. Y.

WATER MAIN TAPPING MACHINES
Hays Mfg. Co., Erie, Pa.
H. Mueller Mfg. Co., Decatur, Ill.
A. P. Smith Mfg. Co., E. Orange, N. J.

WATER METERS (See Meters, Water)

WATERPROOFING COMPOUNDS AND MATERIAL
*Barber Asphalt Co., Philadelphia.
*Barrett Company, N. Y.
*Philip Carey Co., Cincinnati, O.
*Standard Oil Co. (Indiana), Chicago
*Texas Company, N. Y.
Atlantic Refining & Asphalt Corp., Phil'a
General Firep'f'g Co., Youngstown, O.
Master Builders' Co., Cleveland, O.
Minwax Co., N. Y.
Protexol Corp., N. Y.
Ruberoid Co., N. Y.
Sandusky Cement Co., Cleveland, O.
Sonneborn Sons, Inc., N. Y.
Toch Brothers, N. Y.
Truscon Laboratories, Detroit, Mich.

WATER PURIFICATION (See also Fil-ters)
*Wallace & Tiernan Co., Inc., Newark, N. J.
Paradon Eng. Co., L. I. City, N. Y.
R. U. V. Co., N. Y.

WATER PURIFICATION CHEMICALS
Arnold Hoffman & Co., Inc., N. Y.
E. I. Du Pont de Nemours & Co., Wilm-ington, Del.
Electro Bleaching Gas Co., N. Y.
General Chemical Co., N. Y.
Hooker Electrochemical Co., N. Y.
Mathieson Alkali Works, Inc., N. Y.
Penna. Salt Mfg. Co., Philadelphia

WATER SOFTENERS
Amer. Water Softener Co., Philadelphia.
Cochrane Corp., Philadelphia.
Graver Corp., E. Chicago, Ind.
Int'l Filter Co., Chicago.
Permutit Co., N. Y.
W. B. Scaife & Sons, Pittsburgh, Pa.
Wayne Tank & Pump Co., Ft. Wayne, Ind.

WATER WASTE DETECTION
*Pittomcter Co., N. Y.
Empire Elec. & Water Co., Inc., N. Y.
Simplex Valve & Meter Co., Phil'a.

WATER WHEELS
Allis-Chalmers Mfg. Co., Milwaukee.
Wm. Cramp & Sons Ship & Eng. Bldg. Co., (I. F. Morris Dept.) Phil'a.
J. Loefel & Co., Springfield, O.
Newport News Shipbldg. & Dry Dock Co., Newport News, Va.
Pelton Water Wheel Co., San Francisco.
S. Morgan Smith Co., York, Pa.
Worthington Pump & Mch. Corp., N. Y.

WATER WORKS PUMPS (See Pumps)

WELDING APPARATUS
*Alex. Milburn Co., Baltimore, Md.
Burke Elec. Co., Erie, Pa.
General Elec. Co., Schenectady, N. Y.
Lincoln Elec. Co., Cleveland, O.
Oxweld Acetylene Co., L. I. City, N. Y.
Smith's Inventions, Inc., Minneapolis, Minn.
U. S. Light & Heat Corp., Niagara Falls.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

WELL SCREENS
A. D. Cook, Inc., Lawrenceburg, Ind.
E. E. Johnson, Inc., St. Paul, Minn.

WELLS, CONCRETE
Kelly Well Co., Grand Island, Neb.

WELL-DRILLING AND BLAST HOLE MACHINES
*Keystone Driller Co., Beaver Falls, Pa.
Armstrong Mfg. Co., Waterloo, Ia.
Loomis Mach. Co., Tiffin, O.
Sanderson Cyclone Drill Co., Orrville, O.
Star Drilling Mach. Co., Akron, O.

WHEELBARROWS
*Akron Barrow Co., Cleveland, O.
*Jackson Mfg. Co., Harrisburg, Pa.
*Lansing Co., Lansing, Mich.
*Toledo Wheelbarrow Co., Toledo, O.
Asheboro Wheelbarrow Co., Asheboro, N. Carolina.
Chattanooga Wheelbarrow Co., Chat-tanooga, Tenn.
Cleveland Wheelbarrow Co., Cleveland, O.
Fairbanks Co., N. Y.
Puffer-Hubbard Mfg. Co., Minneapolis.
Sidney Steel Scraper Co., Sidney, O.
Sterling Wheelbarrow Co., Milwaukee.

WINCHES
*Clyde Ir. Wks. Sales Co., Duluth, Minn.
*Dobbie Fdry. & Mch. Co., Niagara Falls.
*Ingersoll-Rand Co., New York
*Mundy Sales Corp., N. Y.
*Street Bros. Mach. Wks., Chattanooga
Bethlehem Shipbldg. Corp., Bethlehem, Pa.

Indicates that the manufacturer carries an advertisement. See index facing inside back cover.



THE OSGOOD COMPANY

are using

WILLIAMSPORT

Telfax Tape Marked — Factory Certified

WIRE ROPE

as standard equipment.

Williamsport ropes are the only make that comes from the plant fully marked in indestructible, plain English proof of Tensile Strength. Good reliable Crane and Shovel Manufacturers are fast adapting Williamsport for their machines.

They cost more per foot of rope but much less per mile of service.

You have a right to demand positive proof of tensile strength other than a mere "say so," of the seller. Williamsport gives this proof voluntarily—For your protection of life and limb insist upon it.

WILLIAMSPORT WIRE ROPE COMPANY

MAIN OFFICE AND WORKS:
WILLIAMSPORT, PA.

GEN'L SALES OFFICES:
PEOPLES GAS BLDG., CHICAGO, ILL.

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Where to Purchase

39

Chisholm-Moore Mfg. Co., Cleveland, O.
Dake Eng. Co., Grand Haven, Mich.
Erted Machy. Mfg. Co., Portland, Ore.
Lidgerwood Manufacturing Co., N. Y.
Mead-Morrison Mfg. Co., E. Boston

WINDOW FRAMES AND SASH (Metallic)

*Truscon Steel Co., Youngstown, O.
Wm. Bayley Co., Springfield, O.
Detroit Steel Prod. Co., Detroit.
E. H. Friedrick Co., Holyoke, Mass.
David Lupton's Sons Co., Philadelphia
Penn Metal Co., Boston.
Sykes Co., Chicago.

WIRE AND CABLE

*Williamsport Wire Rope Co., Williamsport, Pa.
American Cable Co., N. Y.
Amer. Steel & Wire Co., Chicago.
Copperweld Steel Co., Bradnock P. O., Rankin, Pa.

Fischer & Hayes Rope & St. Co., Chicago
General Elec. Co., Schenectady, N. Y.
Habirshaw Elec. Cable Co., Inc., N. Y.
Hazard Mfg. Co., Wilkesbarre, Pa.
Macwhyte Co., Kenosha, Wis.
Nat'l India Rubber Co., Bristol, R. I.
N. Y. Insulated Wire Co., N. Y.
Okonite Co., Passaic, N. J.
J. A. Roebling's Sons Co., Trenton, N.J.
Safety Ins. Wire & Cable Co., N. Y.
Simplex Wire & Cable Co., Boston.
Standard Underground Cable Co., Pittsburgh, Pa.
Tubular Woven Fabric Co., Pawtucket, R. I.
Waterbury Co., N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE GLASS

Mississippi Wire Glass Co., N. Y.

WIRE MESH REINFORCEMENT

*Truscon Steel Co., Youngstown, O.
Amer. Stl. & Wire Co., Chicago
Nat'l Stl. Fabric Co., Pittsburgh, Pa.
Wickwire Spencer Steel Co., N. Y.

WIRE ROPE (See Rope, Wire)

WOOD BLOCKS (See Paving Blocks)

WOODWORKING MACHINES

*Amer. Saw Mill Mach. Co., Hackettstown, N. J.
*Ransome Conc. Machy. Co., Dunellen, N.J.
Fairbanks, Morse & Co., Chicago.
Jones Superior Mach. Co., Chicago.

WOOD PRESERVATIVES

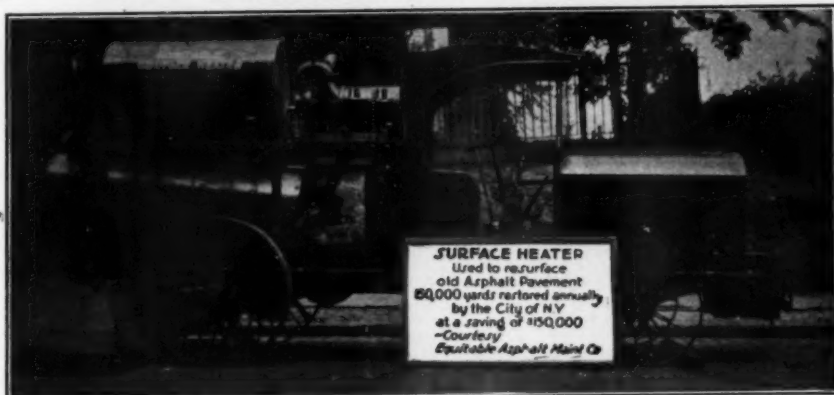
*Barrett Co., N. Y.
Protexol Corp., N. Y.

WRENCHES

Snap-On Wrench Co., Chicago.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*

MAKE BETTER ASPHALT STREET REPAIRS



EQUITABLE SURFACE HEATER

(Improved Lutz Surface Heater)

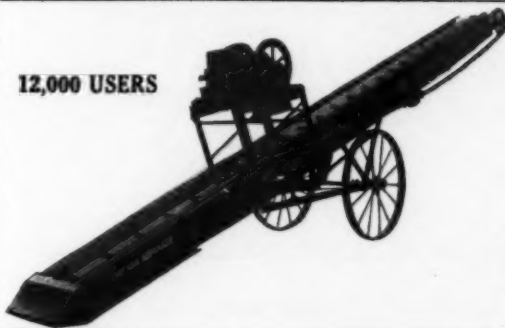
The new improved model is operated with a gasoline engine, designed for power at low speed. The change in this machine from steam to gasoline practically doubles its capacity, simplifies its operation, saves time and labor, permitting a more economical operation of the machine. It eliminates all dirt, water and steam and makes it possible to resurface without flame, from 1,500 to 2,000 sq. yds. of pavement in an eight-hour day. It is easy to start and operate and anyone that can operate an automobile can easily run this machine.

A letter or post card will bring you full and complete information as to terms.

EQUITABLE ASPHALT MAINTENANCE COMPANY

KANSAS CITY, MISSOURI

12,000 USERS



The AUTOMATIC PORTABLE CONVEYOR

WITH THE

Non-Clogging Receiving End FOR

Every Conveying Purpose

CHICAGO AUTOMATIC CONVEYOR COMPANY

Originators of the Portable Conveyor

998 Old Colony Bldg. CHICAGO

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Noise reduction



H. S. Williams, Assistant Superintendent of Equipment of the Department of Street Railways, City of Detroit. Mr. Williams is an authority on problems related to noise reduction, and is Chairman of the Noise Reduction Committee of the American Electric Railway Engineering Association.

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

now being given serious consideration

"SOMETHING must be done to dampen the vibrations set up in the track rails if we are to go the limit in our efforts to reduce the noise in car operation."

That is the opinion recently expressed by H. S. Williams of the Detroit Street Railways. And as he is Chairman of the Noise Reduction Committee of the American Electric Railway Engineering Association, Mr. Williams speaks with the voice of authority.

Elaborating on his point of view, Mr. Williams continued, "This problem did not exist in old-time construction on wood ties. But modern rigid construction possesses such characteristics as to make it exceedingly noisy when cars pass over it.

"As this type of construction is required for economic reasons, it becomes necessary to modify it to such an extent that it

shall not be objectionably noisy. Otherwise, there will be such a racket within the cars as to drive away passengers, and also to cause serious protest from residents of adjacent property."

The marked reduction in noise is always commented on following the installation of Carey Elastite System of Track Insulation.

The Carey System also lessens pavement failure in the track zone because it keeps out water and frost, and takes up expansion stresses. Engineers are finding, too, that it greatly prolongs the life of track and pavement. Write for complete information.

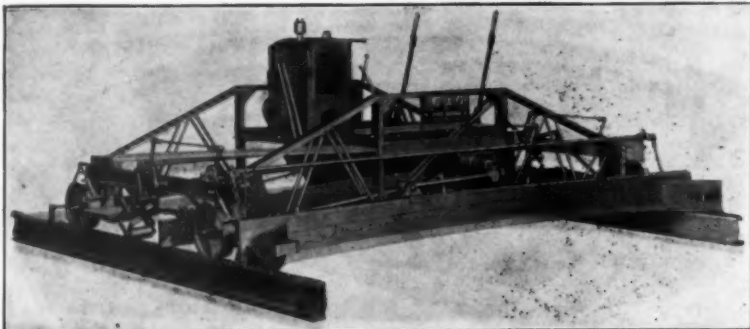
The Carey Elastite System of Track Insulation consists of a preformed asphaltic compound which forms a resilient cushion between the rail and the pavement. Made to fit any rail section. A tap with a mallet sets the strips in place. Entirely unaffected by moisture or changes in temperature.

THE PHILIP CAREY COMPANY
Lockland, Cincinnati, Ohio

**Carey
Elastite**
TRADE MARK REGD. U.S. PATENT OFFICE



SYSTEM OF
TRACK INSULATION



THE NEW LAKEWOOD FINISHER

Two Machines in One—A Screed and Tamper Insures a Smooth Surface and Denser Concrete. Many New Features and Mechanical Improvements.

Write for Bulletin 47-M

THE LAKEWOOD ENGINEERING CO.,

CLEVELAND, O.



SCHRAMM No. 120 MOUNTED ON FORD ONE-TON TRUCK

SCHRAMM, Inc.

MAIN OFFICE AND FACTORY
WEST CHESTER, PA.

54 Day Street
NEW YORK

549 W. Washington Street
CHICAGO

331 Fourth Ave.
PITTSBURGH

209 Arch Street
PHILADELPHIA

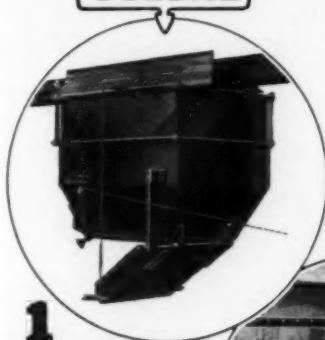
When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

BLAW-KNOX is ready for You

(Specifications are Demanding)

UNIFORM CONCRETE

Measurement by
VOLUME



1

ADJUSTABLE MEASURING BATCHERS for any bin, providing accurate aggregate batching by volume. Quickly adjusted for changes in capacity. Equipped with no-jam strike-off gate.

Measurement by
WEIGHT



2

BLAW-KNOX WEIGHING BATCHER—equipped with beam-scales—for weighing aggregates accurately in 20-45 seconds. Can be installed on any bin.

Measurement by
INUNDATION



3

BLAW-KNOX INUNDATION SYSTEM for making constant concrete automatically—by compensating for bulking of sand and by exactly controlling water-supply in each batch. Prevents cement over-run and under-running. Insures uniform, stronger concrete.

BLAW-KNOX BINS

TYPES AND SIZES

Self-Cleaning and Portable Type
ALL STEEL
Two Openings
Capacities - cu. yds.
14, 24
49, 81

Square Hopper Type
ALL STEEL
Four Openings
Capacities - cu. yds.
52, 84

Demountable Type
WOOD SIDES
AND PARTITIONS
Capacities - cu. yds.
27, 39, 54

Circular Type—steel
FOR SAND AND GRAVEL STORAGE
Capacities - cu. yds.
33, 55, 87
132, 202

Special Bins for all purposes.
Suspension craned type or any construction to meet special conditions.

BLAW-KNOX PRODUCTS

Batchers for concrete and aggregate

Measures for concrete batching

Inundation System

Steel Paving Machine

Concrete Pump

General Machinery

Turntables

Steel Buildings

COME TO
HEADQUARTERS

for MEASURING EQUIPMENT



When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

STEAM — GAS — OR ELECTRIC DRIVE



Plowing and Loading Old Paving Surface

This is hard, shallow digging—a typical Keystone job. There is no other machine for it. Keystone shovels are now being built heavier, stronger, higher powered than ever before; and they are used for heavy excavation in hard materials with $\frac{3}{4}$ -yard whirlers five tons heavier but in the shallow cutting field, 6 inches to 6 feet, the Keystone is unique. Here its 14-foot crowd and flat-bottom Skimmer give it twice the efficiency of any other power shovel.

First cost, moving cost, upkeep and depreciation on the Keystone Shovel are low. It can be turned into a Keystone Trenching Machine by adding a Ditcher Bucket and Attachments costing about \$325.00; or it can be equipped with a boom extension and $\frac{1}{2}$ -yard clamshell for use as a traction crane. It is an interesting story, told at length in a new Catalog which will go at your request.

CAN be fitted also with Ditcher, or Clamshell Bucket for ditching, back filling, cellar-digging, or unloading cars. A general utility traction shovel with all the efficiency of specialized design.



KEYSTONE DRILLER COMPANY — BEAVER FALLS, PENNA.
170 BROADWAY, NEW YORK MONADNOCK BLOCK, CHICAGO JOPLIN, MO.

KEYSTONE SHOVEL

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

EDGAR J. BUTTENHEIM
President

TOM DIX
Vice-President

THEODORE R. KENDALL
Editor

HERBERT K. Saxe
Treasurer

MYRON MACLEOD
Advertising Manager

Vol. XII

No. 5

Contractors' and Engineers' Monthly

May,

1926

Published Monthly at 443 Fourth Ave., New York, by Buttenheim-Dix Publishing Corporation.
Branch Office: Tribune Tower, Chicago, Ill. Tom Dix, Vice-President; Prentice Ford, Western Advertising Manager; George Conover, Assistant Advertising Manager.

Prevention of Accidents in the Construction Industry

By Leo D. Woedtke

Safety Engineer, Fred T. Ley & Co., Inc., Springfield, Mass.

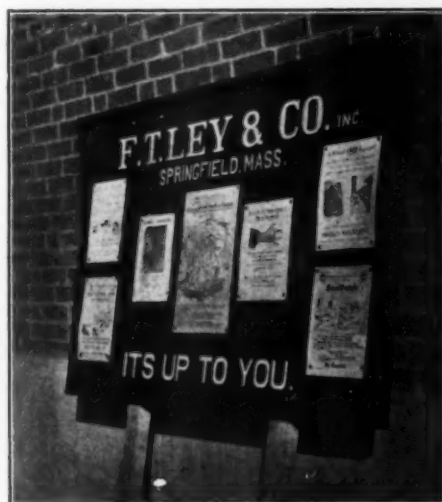
GENERAL contracting, in its many branches, is considered as a high hazard by insurance companies, as is attested by the fact that higher rates are charged for construction work than for any other industry, and the contractor pays a very large percentage of his pay-roll for insurance premium.

With the advent of Workmen's Compensation Acts and the later development of Experience Rating Plans, the contractor practically makes his own rates, in that the regular manual rates for his classes of work are either increased through bad experience, or decreased through good experience. The increase or reduction from the manual rates runs from 1 to 40 per cent, involving either a saving or a loss, running into many figures, in the cost of a substantial year's pay-roll expenditure. These factors have caused the intelligent contractor to give accident prevention considerable attention.

Contractors who have maintained a Safety Department and carried on intensive and consistent safety work, have found that in addition to saving very large sums of money in insurance costs, they have also reduced labor turnover and increased efficiency through keeping trained men on important work without loss of time, and have also secured the profound respect of labor organizations and employees.

The contractor's safety program must necessarily begin from the very top, and once the chief executive is sold on this proposition, he

should then delegate some one person in his employ to head up or direct the safety and accident prevention work in his organization. And right here let me emphasize strongly that it is not necessary to employ an additional man to do this work, nor is it necessary that the employee selected should be a safety engineer, as all he really needs to start with is the authorization and backing of the chief executive to create his standing with the superintendents, foremen, and workmen, so as to se-



A PORTABLE BULLETIN BOARD FOR DISPLAYING SAFETY POSTERS

A Safe Mixer



1. Sheave completely guarded
2. Fence at right
3. Sign on bottom of hopper

cure the support and cooperation of the men in the field.

The problem should then resolve itself into two main parts, namely, mechanical safeguarding, and safety education. As to the first, a thorough inspection of the contractor's machinery, equipment, and tools, with a view to installing safeguards where necessary or advisable, is all that is required, and the recommendations of the safety director will, of course, call for the cooperation of the head of the equipment plant, whatever his title may be. With this step taken, the head of the firm must be willing to stand for the expense of the safeguards or changes required.

As a brief list of recommendations on mechanical safeguarding, I submit the following from my own firm's experience:

Mechanical Safeguards Which Can Be Secured at the Time of Purchasing Machinery, Equipment and Tools

All boilers to be equipped with approved gage-glass guards.

All gears, keys, protruding or revolving

parts to be guarded on all mechanically driven equipment.

All saws and other woodworking machinery to be fitted with approved guards.

All platform elevators to be equipped with safety devices for protection against the dropping of the elevators from cable breaking.

Adequate and safe grab handles, steps, etc., to be provided on locomotives, cars, cranes, steam shovels, and transporting equipment.

All electrical control switches to be of approved safety type, properly enclosed.

Cans for gasoline and flammable oils to be of approved safety type. Safety type of racks or holders should be provided for acid containers. Price of striking hammers, hand and stone hammers, or any hand striking tools should be secondary, as the first consideration should be quality and safety features.

Ladder specifications and codes have been established in several states, and while they vary somewhat, one recommendation can be made here, namely, that ladders should never be painted with pigment paint, as the use of linseed oil and shellac is to be preferred.

Mechanical Safeguarding Which Can Be Done by the Contractor Before the Plant, Tools and Equipment Leave the Contractor's Yards

Hoisting Equipment.—All gears, revolving projections and clutches should be thoroughly enclosed or otherwise protected by the equipment department in accordance with approved recommendations and practice.

Steam Boilers.—All boilers should be furnished with removable gage-glass guards when shipped from the equipment plant.

Circular Saws.—All table saws should be equipped with approved types of spreaders and saw guards when shipped from the equipment plant. All swing saws should have the top half of the saw blade completely enclosed by the equipment department.

Jointers or Buzz Planers.—The equipment department should furnish all jointers or buzz planers with cylindrical or safety heads, and if replacement of same becomes necessary at any time, these types only are to be used. The equipment department should also furnish an approved type of guard for jointer heads.

Pulley Blocks.—The equipment department should see to it that all pulley blocks have the proper thickness of sheaves so that there will not be any unnecessary space between the sheave and the shell such as would cause jamming or slipping of cables or ropes.

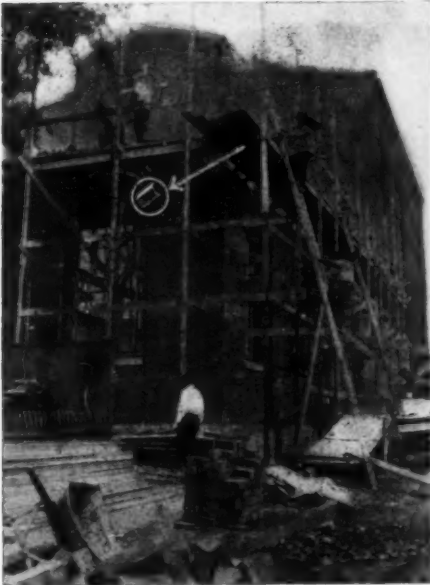
Builder's Elevators.—The equipment department should see to it that all the unused sides of builders' elevators are boarded up and

6 Killed! 1500 Injured!

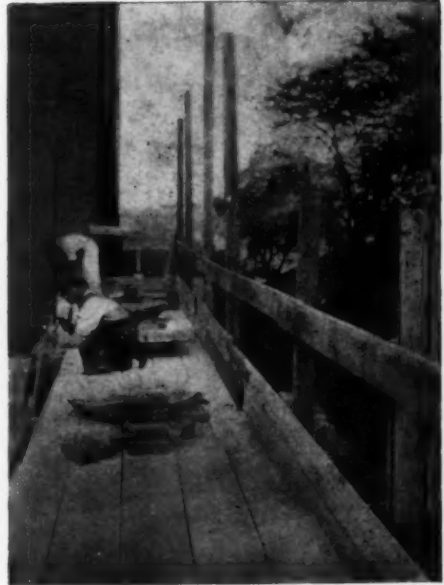
By Objects Falling from Overhead

Massachusetts Accidents for One Year

MANY happen ON OUR own JOBS



Scaffolding with no toe board — brick falling
Courtesy of Fred T. Ley & Co., Inc.



Protected Scaffolding with toe boards and railing
Courtesy of Fred T. Ley & Co., Inc.

Is Your Carelessness Adding to this Number?

PROTECT MEN BELOW

Inspect Your Scaffolds and Staging Every Day

that the platform elevators furnished by them are equipped with a safety device to hold the elevator in case the cable breaks.

Electrical Equipment.—The equipment department should furnish the enclosed or "dead front" type of switch whenever they can be used by the jobs.

Gasoline and Kerosene Cans.—The equipment department should furnish an approved safety type of can for containing gasoline only. I recommend a different type of can for kerosene for fear that kerosene and gasoline may be mixed. All cans should be stenciled in red or white letters either "Gasoline" or "Kerosene."

Engine-driven Cement Mixers.—The equipment department should provide an approved housing about all cement mixer engines to enclose all moving parts, including shaft ends.

Automobile Trucks.—The equipment department should furnish signs reading, "Danger—Keep Off."

Locomotives.—The equipment department should install grab handles and steps on all locomotives they furnish and should also furnish gage-glass guards for all locomotives.

Chisels and Hammer Drills and Bull Points.—All chisels, hammers, drills, and bull points sent out from the equipment department should be properly dressed on hammer faces or head, and all handles should be properly wedged and tightened.

Car-Dumping Wrenches.—The equipment department should furnish car-dumping wrenches when specified or requested by the job.

Portable Ladders.—All ladders sent out by the equipment department should be tested as well as treated with linseed oil and shellac instead of paint.

Red Paint.—The equipment department

should paint all parts of equipment in red where any such part is covered or protected by a mechanical guard, so that when any such guard is removed the bright red underneath will immediately become apparent, and call attention to the missing guard. The equipment department should furnish and attach to each piece of equipment or machinery on which there are or should be mechanical safeguards, a tag listing the safeguards.

Mechanical Safeguarding Which Can Be Done on the Job

Hoisting Equipment.—The job should see to it, if it becomes necessary to temporarily remove any guards, that they are put back into place without fail before the equipment is put in use again.

Steam Boilers.—The job should be responsible for installing the detachable gage-glass guards as well as all fittings, and the job superintendent or master mechanic should see to it that all attachments are in working order and are tested at least once per week, as well as complying with all state requirements wherever the job is located. I recommend that the blow-off cock be opened at least once per day, preferably at the time of steaming up in the morning, as any scale or sediment which would have accumulated during the previous day and night can then be blown off. This will insure better steaming and preservation of the boiler as well as preventing accidents.

Circular Saws.—The job should provide a definite stop on swing saws to prevent the top of the saw from traveling beyond the front edge of the working table. It will also be necessary to chain the counterweight to the frame of the machine or other convenient fixed object to eliminate the possibility of its



**SAFETY
POSTERS DISPLAYED
ON WALLS OF
CONTRACTOR'S FIELD
OFFICE**

falling on the operator. On treadle-operated swing saws, the job should install a strap over the treadle so arranged as to prevent accidental operation of the treadle. The job must also provide adequate guards for belts, pulleys, and revolving projections in connection with the driving of the different types of saws. Complaints are often made regarding saw guards removed and not put back in place, as well as equipment returned with guards missing. The job superintendent should be held responsible in such cases.

Jointers or Buzz Planers.—The equipment department should do whatever guarding of belts, pulleys, and revolving projections is possible on the jointers and planers, but the job should provide the guarding of belting and shafting when planers are driven from countershaft.

Builder's Elevators.—The job should see to it that the unused sides of the elevator are properly boarded up and that the openings to elevator wells are properly guarded as conditions on the job require.

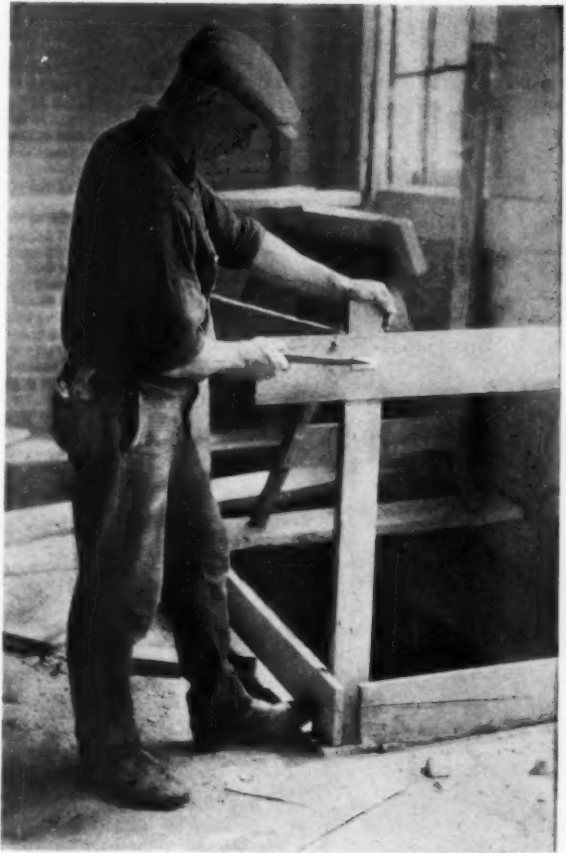
Electrical Equipment.—The proper safeguarding of electrical equipment, wiring, switch and fuse cut-outs must be taken care of by the job, and this is controlled more or less by local building codes, with which the job must become familiar.

Gasoline and Kerosene Cans.—The job superintendent should see to it that a responsible person is in charge of handling gasoline and kerosene, as serious accidents will certainly result if lanterns are filled with gasoline by mistake. The job should be expected to stencil or letter "Gasoline" or "Kerosene" in fairly large type on any cans they purchase or provide themselves.

Engine-driven Cement Mixers.—The job should be responsible for keeping the doors of such housing closed when the operator is not working on the engine, with the exception of such doors as must be left open for air.

Automobile Truck Signs.—These signs caution persons about riding on the trucks, and

THOUGHTFULNESS



To Put Up a Guard-Rail Takes Only a Few Minutes, Yet It May Save a Life

National Safety Council Bulletin No. CN 156, adapted from suggestion of the General Builders Association, Detroit

the job superintendent should be responsible for their being in place.

Chisels and Hammers, Drills and Bull Points.—The job must keep all such tools properly dressed and all handles wedged or tightened, and the job blacksmith or whoever dresses such tools should be instructed and followed up in this regard.

Portable Ladders.—The job should be required to test all ladders periodically and discard or destroy (as advisable) any unsafe or unsound ladders. Under no circumstances are ladders to be painted with lead and oil, which treatment covers up defects or weak spots

that would otherwise be noticed.

Missing Parts.—On receipt of machinery or equipment by the job, the list on the tag referred to under Section 2 should be checked and if parts are missing the same should be reported immediately to the equipment department and the job should be charged with any such parts which are missing when the machinery or equipment is returned to the equipment department. It is also of great importance that the job, when returning equipment, sees to it that all detachable safeguards are properly boxed and shipped with the equipment, whether the equipment is being returned to the contractor's general storeyard or being shipped to another job.

Safety Education on the Job

As to the second part, namely, safety education, this takes in practically all that must be done right on the construction operation and includes matters completely under the control or in the power of the superintendent and foreman, as well as training both the skilled and unskilled workmen themselves to think and act safely. As a few suggestions along this line, I offer some of the things I have worked out myself over a period of years as director of safety for Fred T. Ley & Co., Inc.:

Semi-monthly safety letters to each job superintendent, with information, suggestions, and friendly criticism, including not more than four fresh or new safety bulletins or posters, which bulletins can be secured from the National Safety Council and occasionally from some insurance companies. The use of home-made bulletins, blueprinted, photographed, etc., is also advisable.

Occasionally, special articles on some one thing at a time, such as "Chains, Ropes and Cables," "Safety Loads," "Dropsy or Butter-Finger Habit," "Fire Prevention," "Stagings," "Goggles," "Salamanders," etc.

Danger tags, with the firm's name thereon, supplied in small tin containers fastened on the inside of tool-boxes, in the blacksmith shop, tool-house, field office, etc., which are easily available for tying on the defective or condemned tools, machinery, or equipment.

Suggestions for stout, sound runways, platforms, and stagings, with proper toe-boards, hand-rails, etc.

Suggestions and education on proper piling and placing of piles of lumber, brick, pipe, cement, stone, tile, etc.

Suggestions or recommendations on good housekeeping, cleaning aisles, passageways, etc., from debris, turning down protruding nails and removing causes of stumbling and falls.

Good Housekeeping and the Job Safety Committee

There is much which could be said, that space does not permit, on three of our usual causes of accidents in the construction game, which come under the head of stumbling, falls, slipping and dropping material, all of which, however, really come under the one heading of good housekeeping, and if the contractor who is beginning safety work on an organized basis will devote his energies to good housekeeping, he will cover at least half of the ground involved in accident prevention. One development which usually comes later, but which in my opinion should be put into operation at the very beginning, is the Job Safety Committee. I have tried this out in a number of ways, and for the average construction job would recommend as follows:

That each job have a Safety Committee to consist of the job superintendent at the head and not less than two additional men, either foremen or straight time men, this committee to pay particular attention to and make observation of all hazards present on the work, and if such come within the scope of their authority either to give such directions or orders as will eliminate the hazard, or, if beyond their authority, to make immediate report to the superintendent for his action. In addition to this, the members of the Committee shall make periodic safety inspections of the entire work, and report to the job superintendent with any recommendations they see fit to make.

The superintendent should meet with the members of this committee at least once a week, for fifteen minutes, or whatever part of an hour may be necessary, to review their work and also to analyze any accidents which have occurred during the previous week, and take whatever action may be necessary to prevent a recurrence of such accidents as have already occurred on the job, or which, through observation, may occur because of conditions found. The safety director in the office should receive a brief memorandum of the minutes of such safety meetings, so that he may cooperate with the job by suggestions, advice, or, if necessary, by interceding with the head of the firm for whatever may be necessary to bring to his attention in the way of expense or change of policy. In conclusion, I would heartily recommend that each and every contractor join the National Safety Council and through it, of course, the Construction Section of that body, so as to be in constant touch with the developments of accident prevention in general and in the construction industry in particular.

Double-Acting Hammer Used in Building Demolition

Contractor Makes Ingenious Use of Pile-Driving Equipment

THE usual method of wrecking concrete buildings is through the use of sledges, dynamite, acetylene torches, and skull-crackers. Because of the location of a two-story reinforced concrete garage at 61st Street and Central Park, New York City, the contractors Spencer, White & Prentis, New York City, could not resort to the quicker means of destruction, such as explosives, and the slower means would have meant a considerable loss in time.

The hammer as rigged for demolition work had an 18-inch length of 16-inch pipe with 1½-inch walls slung under the hammer by means of a cable running over the top of the hammer and through holes bored in the pipe. This made the hammer and pipe virtually one unit and made it easy to handle them with a crane. At distances of about 2½ feet, holes were punched with this equipment in the floor as far as the reinforcing steel. It was found that the most effective and quickest work could



DOUBLE-ACTING PILE HAMMER WITH PIPE ATTACHED READY TO WRECK FLAT SLAB FLOOR CONSTRUCTION

It is to the credit of Frederick B. Smith, a member of the firm, that a double-acting McKiernan-Terry pile hammer was pressed into service to break up the reinforced concrete structure. This 5,000-pound pile hammer completed the work at less cost than the original estimate and in 25 working days. The pile hammer was used in practically all parts of the demolition, including the destruction of columns, curtain walls, and floors.

The method first adopted in wrecking was to use a skull-cracker, the heavy steel ball being dropped from a considerable height onto the various floors, but this was not effective, as the ball bounced considerably and was really a great source of danger.

be done with the air valve half open instead of fully open.

One of the great advantages of this method of demolishing reinforced concrete buildings is that the reinforcement is broken away from the concrete by the rapid blows of the double-acting hammer, so that only a few cuts with an oxyacetylene torch are necessary to free large sections of reinforcement with the few pieces of concrete still attached.

The pipe was removed from the hammer, and the hammer legs set on the curtain walls, when this section of the structure was demolished. The contractor reported that the hammer penetrated nearly 12 feet of 6-inch curtain wall in about 6 minutes.

An Horatio Alger Story in the Construction Field

Rapid Rise of Frank Rolland Patterson, of Detroit



F. R. PATTERSON

JUST seven years ago Frank Rolland Patterson arrived in Detroit a youth of 25. His worldly possessions included a college education, a degree of Civil Engineer, a badly battered roll-top desk, and enough cash to rent a corner of a dingy office.

Today, at 32, he is President of the F. R. Patterson Construction Company, 2631 Woodward Avenue, Detroit, Mich., and has built millions of dollars' worth of buildings, including some of the finest public and private structures in Michigan. His business is such that he has just taken out a policy for \$1,000,000 on his life.

When Mr. Patterson decided to go into the construction business for himself eight years ago, he selected Detroit as the most promising of all cities in the United States. His success has fully justified his choice. His experience in construction work before reaching Detroit was obtained in Chicago and also with the Pennsylvania Railroad Company. He was born at Atwater, Ohio, and was educated at the public schools and Case College at Cleveland and at Central Institute, also at Cleveland. When he decided to compete with other contractors in Detroit, he spent his first few months in feeling the pulse of the local labor

market and the cost of operations and materials. Then he obtained his first contract, a \$400,000 proposition, which he completed to the satisfaction of every one.

Other contracts followed in rapid succession, among them being the buildings for the C. H. Wilson Body Company, a High School at Wyandotte, a unit of six reinforced concrete buildings for the Detroit Packing Company, a church of Gothic design at River Rouge, another church of Romanesque design on the North Side, and a third and a fourth church outside the city. Other contracts called for the erection of grade and high schools in the city, the Genesee County Court House at Flint, which is now under construction, a hotel at St. Clair, and schools at Melvindale, Mich.

Mr. Patterson believes that the construction and contracting field offers unlimited opportunity to young men who will start out with the determination to stick to it and who are willing to strive through the lean years that almost invariably precede the success that comes in the end. He also is convinced that the growth of Detroit will continue to be rapid, but decries any talk of a sudden boom in Detroit, either in values or abnormal construction. He points out, however that in its rapid increase in population and the spread of the business district, many valuable pieces of property are now occupied by buildings that are but little better than shacks and that they must give way in the near future to income-producing properties.

Modern Steel Bins vs. Home-made Equipment

IN the third part of his interesting study of efficiency in concrete road construction, published in *Public Roads*, J. L. Harrison, Highway Engineer, U. S. Bureau of Public Roads, states that modern steel bins are preferred to home-made equipment. For handling materials, some sort of bin or hopper must be used. The up-to-date contractor has very generally adopted some one of the better types of steel bins. These can be moved from job to job and, as they last a relatively long time, become a part of the contractor's regular equipment.

The home-made bin is going out of use because

the measuring devices which may be had with the steel bins are faster, more reliable, and much more accurate. The quicker the operation of the measuring device on the loading bin, the less truck time is involved per trip. First-class modern measuring devices and good steel hoppers will measure and discharge a 5-bag batch of sand and gravel in less than 15 seconds. As the old-fashioned, home-made devices often take a minute or so to unload the coarse aggregate, and half that time to load the sand, the saving in truck time in the use of modern measuring devices more than offsets their greater first cost.

Replacing Old Pavements in Milwaukee, Wis.

Small Revolving Shovel Rips Up Old Asphalt and Concrete Base

THE White Construction Company was organized in Milwaukee in 1907. Today, 18 years after its founding, the organization is known throughout the Central States, has its head office in Chicago and maintains other offices in Milwaukee, Wis., Madisonville, Ky., and Pontiac, Mich. During the 18 years of its activities, this company has specialized on grading and paving, sewage disposal, bridges, and railroads. Its experience has been wide and the organization is a highly efficient one.

Experience in Repairing

This company has tried out many methods of removing bitulithic surface on paved streets, preparatory to resurfacing and re-

moving the entire pavement, both surface and base where the base also was to be replaced.

Ten years ago the work was mainly that of resurfacing and the old surface was broken with plows drawn by teams. Some very fast work was done by this method, but about the year 1917 motor trucks replaced the horses for pulling the plows. This method again increased the speed of the work. Some three years later the company had considerable work involving the removal of both base and surface. At that time they used a steam shovel with a skull-cracker. The ball weighed about 700 to 800 pounds and broke up the pavement so that it could be handled by the shovel. After 500 or 600 square yards of pavement was broken in this manner, the



**WHITE CONSTRUCTION
COMPANY'S SMALL
REVOLVING SHOVEL AT
WORK GRADING JACKSON
STREET, MILWAUKEE**

At left, shovel is shown loading 5-ton Mack truck, which hauled the material to a dump on the lake shore 2½ miles away

At right, the section of pavement in the foreground has been removed and the shovel is making its first cut on the other side of the street





**BUCYRUS
3/4-YARD SHOVEL
BREAKING UP AND
LOADING THE
PAVEMENT
ON NEWBERRY
BOULEVARD**

shovel would load the broken material.

This method has now given way to another by which the shovel, unaided, breaks up and loads pavements consisting of a 6-inch concrete base and a 3-inch asphalt surface.

Last summer the White Construction Company obtained contracts for ripping up old pavements and repaving a number of streets in Milwaukee. To break up and load the old pavement, the company purchased a Bucyrus 20-B steam-driven shovel with crawler mounting and equipped with a 20½-foot boom and a ¾-yard dipper.

Removing 10,000 Square Yards of Paving

The first job on which the shovel was used was that of ripping up about 10,000 square yards of paving on Jackson Street, Milwaukee, for a distance of about half a mile. There were two street-car tracks which broke the stretch of paving to be removed into two strips each 16 feet 6 inches wide. The paving consisted of 3 to 5 inches of asphalt on 6 inches of concrete. The curbing was not disturbed. The work was continually interrupted by the passing of street cars. In fact, it was necessary to stop and wait, clearing the track of fragments when necessary, every 1½ to 2 minutes. In spite of this, the

¾-yard shovel broke up and loaded about 750 sq. yds. per 8-hour day.

Before this job was finished, another rather unusual feature was added. The city of Milwaukee wanted to use the concrete for fill on a bridge approach and did not want the asphalt mixed with it. It was necessary, therefore, to make two trips over the work. On the first cut the asphalt alone was torn up and hauled 2½ miles to a dump on the lake shore. On the second trip the concrete base was loaded and hauled to the bridge approach a mile away. Three 5-ton Mack trucks, two



REMOVING THE LAYER OF ASPHALT FROM THE INTERSECTION OF JACKSON STREET AND JUNEAU AVENUE

Note the light strip of wood at the left of the picture which is used to raise the trolley wire to clear the boom and dipper sticks

**RIPPING UP THE
PAVEMENT AT THE
INTERSECTION OF
FREDERICK AVENUE
AND NEWBERRY
BOULEVARD**

Note that the curbing has been removed from the corner in the background. These small sections of new curb and gutter were poured from a one-sack mixer



owned by Marchese Brothers and one by A. Reis, served the shovel. In spite of having to make two cuts, the contractors kept their yardage up to a satisfactory amount.

The grading was finished in two weeks, and



**¾-YARD DIPPER READY TO PICK UP MATERIAL
THAT HAS BEEN RAKED BACK OFF THE CAR
TRACKS**



**MAKING A CUT ON NEWBERRY BOULEVARD
DIRECTLY TOWARD THE CURBING**

Note that several of the larger pieces have toppled over the curbing and onto the grass. These are thrown back into the cut by the pit man or raked back with the dipper and loaded with the next dipperful

the entire contract, including the grading and placing of the concrete base, was completed four days ahead of the one month allowed in the contract.

Removing 9-Inch Paving

The ¾-yard shovel was next put to work removing a strip of pavement on Newberry Boulevard for a distance of about half a mile. This thoroughfare consists of two paved roads separated by an esplanade, each paved portion being about 37 feet wide. The pavement to be removed was laid 25 years ago by the Barber Asphalt Company and consisted of



DIPPER OF SMALL REVOLVING SHOVEL READY TO LOAD, ON NEWBERRY BOULEVARD

6 inches of concrete overlaid with 3 inches of asphalt. The White Construction Company's contract called for the removal of 23,000 square yards of pavement, both base and surface, and the repaving of the street. Here again, the old pavement was torn up and loaded by the shovel without any previous preparation. On this job, however, the machine was not interrupted by frequent passage of street cars, and the average output was 1,000 square yards a day on one 8-hour shift. The shovel was served by four 5-ton Mack trucks, and the material was hauled two miles to a dump on the lake shore. The time allowed for this job, including the grading and the laying of the concrete base, was six weeks. This was beaten by seven days.

Another Job on Market Street

The White Construction Company's next job of this sort involved about 2,000 cubic yards of grading on Market Street. This street leads to the eastern approach of the new Martin Street-State Street Bridge, and its repaving was included in the city's plan to make the bridge one of the main arteries in Milwau-

kee for east- and west-bound traffic. The grading included the removal of 3 inches of asphalt, an 8-inch base course of concrete, and old ties and ballast to a further depth of 4 inches. On this work five 5-ton Mack trucks served the shovel. The material was hauled to a point about a mile away, where it was used to fill for a future lake-front park. Traffic conditions prevented continuous work.

More Work for the ¼-Yard Shovel

Among other contracts which the White Construction Company has in Milwaukee for work on which the small revolving shovel can be used to break up the pavements, are the following: 4,200 square yards of old concrete pavement to be removed from 27th Street a distance of about one-third of a mile; 4,000 square yards of asphalt and concrete to be ripped up on Marietta Avenue, a strip 1,400 feet long and about 30 feet wide; and about 8,000 square yards of asphaltic concrete to be removed from National Avenue, in two strips, each 20 feet wide and 600 feet long.

ACKNOWLEDGMENT.—Prepared from an article in *The Excavating Engineer*. Illustrations by courtesy of the Bucyrus Company.



GRADING WORK ON NEWBERRY BOULEVARD
Illustrating the manner in which the broken asphalt and concrete loads into the dipper

Liability Insurance Rates Are Increased

New Rates Raise Average for Country to 10 Per Cent

ON April 12 the National Bureau of Casualty and Surety Underwriters announced an increase in rates for manufacturers' and contractors' public liability insurance covering legal liability from accidental personal injuries suffered by the public. The chief risks involved are manufacturing, mining, contracting, railroading and

shipping, stevedoring and freight handling.

The increase raises the average rate for the country as a whole 10 per cent. An increase of 84 per cent affects territory A, including Greater New York and Missouri. Territory B outside of Greater New York and in seven southern and mid-western states was raised 28 per cent.

Increased Cost Due to Improper Fine Grading Methods

By C. J. Moritz

President, C. J. Moritz, Inc., Constructors, Effingham, Ill.

WHAT are proper fine grading methods, and what are improper fine grading methods? The general custom throughout the United States, especially in the localities where the subgrade is composed of suitable homogeneous material, is the use of mechanical devices commonly called subgraders. Some of this equipment is arranged to run on forms pulled by tractors, others are blades direct-connected to tractor power. Experience teaches us that this is the proper method. Where the materials in the subgrade do not permit the ordinary mechanical devices, the approved method is still the use of old-time pick and shovel, mattock and rakes, etc., commonly called the hand method. There may be unusual conditions under which special and unique methods may be developed. For the purpose of this discussion we may assume that the present-day contractor uses proper methods.

Formerly, when a certain thickness of pavement or pavement base was specified, it was generally understood both by the engineer and by the constructor that the specified thickness referred to the *average* thickness with limited variations therefrom either plus or minus. Some engineers considered that an inch variation either way was permissible;

others that $\frac{1}{2}$ -inch either way was satisfactory, provided the average thickness was as specified. Recently, however, there has been a tendency among the engineers and interpreters of present-day specifications to construe the thickness specified not as an average but as a minimum thickness allowable.

This change in attitude, therefore, has made the matter of preparing subgrades of prime importance to the constructors. They are now forced to consider seriously how much additional expense is justified in preparing the subgrade to avoid the added expense of building a thicker pavement than the contract requires.

Information obtained from various contractors has shown us that the basis of arriving at the items of cost included in what the constructor considers the cost of subgrading has been so variable that they are not comparable. Suffice it to say that the average costs as reported have varied from one cent to fifteen cents a square yard of finished subgrade.

The question now resolves itself into two divisions: first, the most economical method of preparing the subgrade, taking into consideration the materials in the subgrade, interference with other operations, and protection of the subgrade when completed; second, the effect of carelessly prepared subgrade upon the cost of extra materials and labor required in the construction of the pavement.

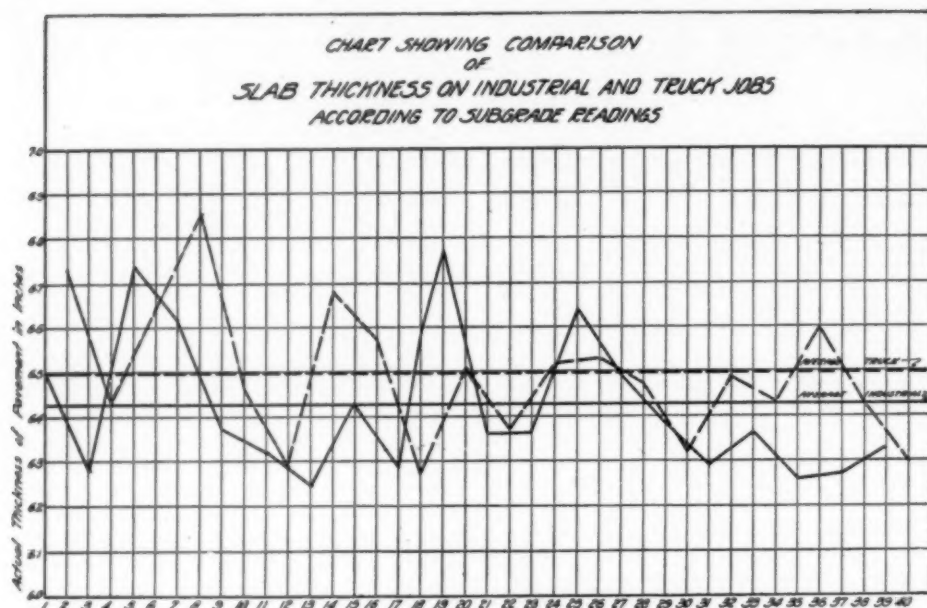
As previously stated, the common way of preparing the subgrade is with the mechanical subgrader where conditions permit, and there is no question that this is the most economical method. It is desirable from the contractor's standpoint, and usually required by the engineers, to maintain at least 500 feet of completed subgrade in advance of the mixer. This permits of economical subgrading methods and prevents possible delay to the continuous advance of the mixer.

To construct and maintain this 500 feet of finished subgrade involves the question of possible interference and additional cost created or prevented by the various methods of hauling aggregates to the mixer. The writer

COMPARISON OF SLAB THICKNESS ON INDUSTRIAL AND TRUCK JOBS ACCORDING TO SUBGRADE READINGS

Taken from the Records of the Illinois State Highway Department for 1925. Forty Jobs Picked at Random.

INDUSTRIAL		TRUCK	
Theoretical Thickness, Inches	Actual Thickness of Slab, Inches	Theoretical Thickness, Inches	Actual Thickness of Slab, Inches
6	6.49	6	6.73
6	6.28	6	6.44
6	6.74	6	6.65
6	6.62	6	6.86
6	6.38	6	6.47
6	6.32	6	6.29
6	6.25	6	6.68
6	6.43	6	6.58
6	6.29	6	6.28
6	6.78	6	6.50
6	6.37	6	6.38
6	6.37	6	6.52
6	6.64	6	6.53
6	6.49	6	6.48
6	6.39	6	6.32
6	6.29	6	6.49
6	6.37	6	6.44
6	6.26	6	6.60
6	6.27	6	6.44
6	6.33	6	6.30
Average	6.418	Average	6.499



Odd numbers are for industrial jobs, even numbers for truck jobs; theoretical thickness of pavement 6 inches

operates in his own organization both industrial and truck hauling equipment. Our own costs have been so variable that I hesitate to draw any conclusions as to the relative merits of industrial and truck haulage on the cost of subgrading. To attempt to discuss the relative merits of various hauling equipment and its effect upon the subgrade without taking into consideration other phases of the operations would be of little value.

From the records of the Illinois State Highway Department we have made a comparison of the actual slab thickness as constructed for a theoretical 6-inch pavement by twenty truck jobs and by twenty industrial jobs. These sections were picked at random and presumably represent various degrees of efficiency in road-building operations. This information is shown in the chart. The dotted line represents the thickness procured on truck operations, and the solid line the industrial operations. The average thickness obtained by the truck outfits was 6.499 inches, or practically $6\frac{1}{2}$ inches. The average thickness obtained by the industrial railway outfits was 6.418 inches. Further analysis of these figures showed that the maximum and minimum excess thicknesses under both forms of hauling were practically the same. There seems to be a slight advantage in the industrial operations. This difference, however, is

so small that it becomes practically negligible in so far as these forty jobs are considered.

Additional Cost of Materials

Now for the second effect of careless subgrade, namely the additional cost of materials and other expenses due to laying excess thickness of pavement. The individual contractor must determine for himself his practical cost of subgrading. He should likewise determine for himself the cost of material on his particular job, analyze the same, and determine to what refinement he may economically work to save the additional cost of materials and the handling thereof and maintain practical and economical subgrading operations.

To present a typical cost analysis of these conditions, I have prepared three tables on cost data for one square yard of concrete pavement of variable thickness. Table I shows the various concrete proportions, the quantities of cement, coarse aggregate, and fine aggregate required for one cubic yard; the cost of materials in cents per square yard of pavement one inch thick, assuming the cost of the cement at \$2.50 a barrel net, the coarse aggregate at \$2.00 per ton, the cost of the fine aggregate at \$1.50 per ton. We find from this table that the total cost of materials on these assumed prices varies from 16.3 cents to $21\frac{1}{2}$ cents for 1 square yard 1 inch thick.

TABLE 1—COST DATA FOR ONE SQUARE YARD OF CONCRETE PAVEMENT, VARIABLE THICKNESS

Quantities Req'd Cu. Yd.				Cost of Materials Per Sq. Yd.			Total Cost	Total Cost
Concrete Proportions	Cement Barrels	Coarse Aggregate, Tons	Fine Aggregate, Tons	1 Inch Thick			Material For 1 in. Thick	Coarse and Fine Aggregates
				Cement at \$2.50 Barrel	Coarse Aggregate at \$2.00 Ton	Fine Aggregate at \$1.50 Ton		
1-1½-3	1.85	1.05	0.59	13	5.85	2.6	21.45	8.45
1-2-3	1.70	0.96	0.73	12	5.4	3.3	20.7	8.7
1-2-3½	1.57	1.04	1.67	11	5.8	3.0	19.8	8.8
1-2-4	1.46	1.11	0.82	10	6.1	2.8	18.9	8.9
1-3-5	1.11	1.06	0.72	7.6	5.9	3.2	16.7	9.1
1-3-6	1.00	1.15	0.65	7.0	6.4	2.9	16.3	9.3

Table on quantities per cu. yd. taken from Turneure & Mauer's "Principles of Reinforced Concrete."

Proportions reduced to tons on a basis of 2500 lbs. for coarse aggregate.

Proportions reduced to tons on a basis of 2800 lbs. for fine aggregate.

TABLE 2—COST DATA FOR ONE SQUARE YARD OF CONCRETE PAVEMENT, VARIABLE THICKNESS

Concrete Proportions	Labor and Hauling Costs Per Sq. Yd. 1 Inch Thick			Overhead Sup't and General Expenses Per Sq. Yd. 1 Inch Thick		
	Cement	Stone	Sand	Cement	Stone	Sand
1-1½-3	1.3	2.9	1.3	0.65	1.5	0.65
1-2-3	1.2	2.7	1.6	0.6	1.4	0.8
1-2-3½	1.1	2.9	1.5	0.55	1.5	0.75
1-2-4	1.0	3.1	1.4	0.5	1.6	0.7
1-3-5	.76	3.0	1.6	0.38	1.5	0.8
1-3-6	.7	3.2	1.5	0.35	1.6	0.75

Labor cost calculated on an average condition with 40c per hour common labor. Hauling cost calculated on an average condition with 2½ miles average haul. Overhead superintendence and general expense from our own experience tables.

TABLE 3—COST DATA FOR ONE SQUARE YARD OF CONCRETE PAVEMENT, VARIABLE THICKNESS

Concrete Proportions	Total Expense Other Than Materials Per Sq. Yd. 1 Inch Thick		1 Inch Thick		½-Inch Thick		¼-Inch Thick	
	With Cement	Without Cement	With Cement	Without Cement	With Cement	Without Cement	With Cement	Without Cement
1-1½-3	8.3	29.75	10.75	15	8.9	7.5	4.5	
1-2-3	8.3	29.0	17.0	14.5	8.5	7.3	4.3	
1-2-3½	8.3	28.1	17.1	14.1	8.6	7.1	4.3	
1-2-4	8.3	27.2	17.2	13.4	8.4	6.7	4.2	
1-3-5	8.1	24.8	17.2	12.4	8.6	6.2	4.3	
1-3-6	8.1	24.4	17.4	12.2	8.7	6.1	4.4	

These costs, of course, are not in proportion for the thickness of the original pavement, because there are given expenses which must be incurred to produce the original pavement. These are only costs which the contractor must bear in laying pavement thicker than the original contract specifies.

In many cases the cement is furnished by the owner, so we have the last column of this table which shows that the cost, of the aggregate only, varies from 8½ cents to 9.3 cents per square yard 1 inch thick.

In Table 2 we have analyzed a series of cost data and reduced them to the given hypothetical conditions. With these conditions we obtain the following labor and hauling costs: ½-cent on cement; 3 cents for stone; and 1½ cent for sand. Our overhead, superintendent, and general expense on the same basis varies as follows: ½-cent on cement; 1½ cent on stone; and 0.7-cent on sand. These costs are for 1 square yard 1 inch thick.

From these two tables we obtain Table 3. The total additional cost of 1 square yard of pavement 1 inch thick, furnishing all materials and labor, etc., necessary to produce this extra inch is approximately 30 cents, including cement, and fine and coarse aggregate. Seventeen cents is the cost of fine and coarse aggregate only. It is possible to operate

closer than 1 inch, although such excess is not unusual. The average excess thickness seems to be about ½-inch. If this be the case, and the constructor's cost of materials and labor are approximately as assumed in these tables, then he has additional expenses of approximately 15 cents per square yard if he has had to furnish the cement, or 9 cents per square yard if he has furnished aggregate only. The last column in Table 3 shows the cost of excess thickness of ¼-inch, which runs approximately 7½ cents per square yard for all materials, and 4½ cents per square yard without cement.

These tables show the possible expense that may be incurred or eliminated by careless or proper subgrading methods.

Most constructors seem to harbor the opinion that it is cheaper to use additional materials than it is to indulge in extreme refinement in the preparation of the subgrade. This statement is no doubt true when the mixer is right up to the finished subgrade. If there is a relatively small spot to be remedied and brought up to the proper grade, it is no doubt more economical to waste a little material than delay the mixing operations. Should this condition continuously prevail upon your job, however, you can very readily see from the cost tables prepared that on an 18-foot

road you can afford to spend a maximum of \$1,500 per mile on your subgrade if you furnish all the materials, or \$900 per mile if you furnish only the aggregates, in order to avoid laying $\frac{1}{2}$ -inch of excess thickness under the conditions mentioned above. Similarly, each $\frac{1}{4}$ -inch excess costs \$750 and \$400 per mile, respectively.

There is, of course, a limit to the amount of refinement that should be exercised on the subgrade. No machinery is at present available or could be devised to produce and maintain a subgrade within less than $\frac{1}{4}$ -inch of a given thickness, especially when it is customary to allow $\frac{1}{4}$ -inch variation in the finished surface of the pavement. To obtain a minimum thickness of 6 inches as required by recent specifications, it is therefore necessary to lay at least $6\frac{1}{4}$ inches, and unless extreme care is used in preparing the subgrade and keeping all finishing machine and subgrader templates adjusted to their proper relative positions, the resulting thickness will be nearer $6\frac{1}{2}$ inches or more. The significance of this in dollars is clearly illustrated in the tables.

If now, in addition to the natural barriers to economy in this direction, we add careless subgrading, the resulting expense assumes astonishing proportions.

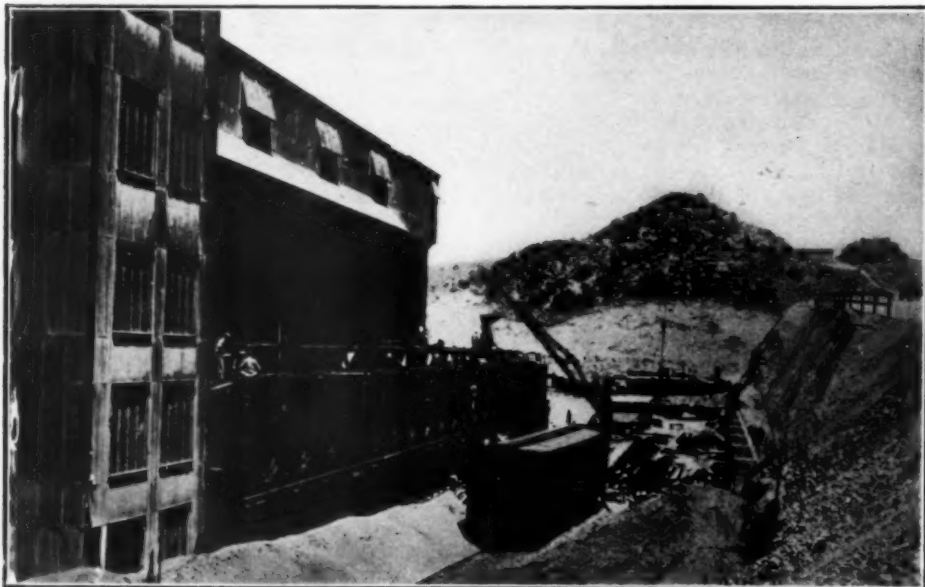
To intelligently and economically produce a subgrade to practical refinements, therefore, the following conditions must be given careful study:

First, the possible effect of the hauling equipment upon the subgrading operations, taking into consideration, of course, the other elements and conditions surrounding your particular problem.

Second, the proper equipment necessary to produce your subgrade, depending upon the soil and materials with which you must contend.

Third, after due consideration given cost of materials, labor, hauling, and other expenses as compared with the actual cost of preparing the subgrade, the constructor must determine for himself the economical plane and degree of accuracy to which it is desirable to prepare the subgrade.

ACKNOWLEDGMENT.—From a paper read before the American Road Builders' Association, Chicago, 1926.



P & H CRANE HANDLING CONCRETE FOR THE NEW LEACHING PLANT OF THE INSPIRATION COPPER COMPANY, INSPIRATION, ARIZ.

When the Inspiration Copper Company found it necessary to erect a monolithic concrete structure 40 feet high and about 200 feet long, its P & H crane was used to hoist the hoppers containing the concrete from the mixer to the points where it was poured. The crane had a 38-foot boom with a 12-foot extension. The men worked in 8-hour shifts, thus giving continuous service. The crane made an average of one cycle every 2.7 minutes all through a period of $4\frac{1}{2}$ days' continuous work.

A Definite Step to Improve Concrete

From a Report of the Committee on Concrete of the Detroit Engineering Society

THE principal causes of defective concrete have been found to be the following: (1) insufficient time of mixing; (2) excess quantity of mixing water; (3) improper character of concrete aggregates; (4) inadequate protection during curing in hot or cold weather.

The result of the Committee's research on these points is as follows:

1. It has been found that the mixing of each batch should continue not less than one minute after all the materials are in the mixer, during which time the mixer should rotate at a peripheral speed of about 200 feet per minute. Mixing in less than this time seriously weakens the resulting concrete. A mixing time of 1½ minutes is to be preferred to the minimum time mentioned, but the one-minute period should be considered an absolute minimum for all classes of work. Observations show that the slogan of nearly all mixing crews is "A batch a minute." The result is that the actual mixing time usually runs from 30 to 40 seconds, which is not at all sufficient for the best results.

2. It has been found that in a great majority of cases, local reinforced concrete has been poured too wet. This is particularly true in the cases of those jobs where concrete has been handled by chuting equipment.

The most practical method of securing field control of mixing water is by what is known as the "slump test." The slump test determines the relative plasticity of fresh concrete by measuring its subsidence from the height of a truncated 12-inch cone after removal of the surrounding form.

The slump test is completely described in a

pamphlet entitled "Design and Control of Concrete Mixtures," published by the Portland Cement Association. A sketch of a standard slump cone is shown therein. These cones can be readily made up by any tinsmith or sheet metal works.

The Committee feels that this is a matter of very great importance, which in the past has been very little considered by those responsible for mixing concrete in the field. Its importance can be appreciated from the fact that within a certain range the strength of concrete varies inversely with the amount of mixing water used. The Committee's recommendations in this matter are as follows:

Reinforced concrete in general, poured for footings, columns, beams, and solid slabs, should be mixed with a slump of approximately 4 to 5 inches.

In the case of concrete placed in small sections such as 4- or 5-inch joists and narrow beams, it may be necessary to use a slump of from 6 to 7 inches for workability, but it should be borne in mind that additional cement must be added to the mixture to make up for the increased mixing water.

3. The question of concrete aggregates available in this district is a very serious one. There are two

ways in which all aggregates may be procured—either as "mixed aggregates," or as "separated aggregates."

In mixed aggregates the coarse and fine aggregates are combined and sold as one material. In separated aggregates, aggregates ranging from the maximum size down to material rejected by a ¼-inch screen are known as coarse aggregate, and material passing through a ¼-inch screen is termed fine aggregate.

Fine Results a Product of Continued Concerted Endeavor

In an endeavor to improve the general quality of concrete going into structures in Detroit, the Detroit Engineering Society, after a general meeting at which a contractor, an aggregate producer, an architectural engineer, and a Portland Cement Association representative spoke, appointed a committee with instructions to investigate the full situation and to make a report of its findings. Its valuable report is reproduced here.

The Society recognizes that in order to bring about a change, continued effort along this line must be made. For that reason a series of eight evening meetings is now being conducted according to a well-outlined program for the discussion of the design and control of concrete mixtures and the water-cement ratio theory.

It is of interest to note that Frank Burton, Commissioner of Buildings and Safety Engineering of the city of Detroit, has stated that the tests of concrete in Detroit have never been better than this year and that he considers it due to the activities of the Detroit Engineering Society.

gate, or "fines." When separated aggregates are purchased, these are delivered to the work in separate loads and are mixed at the job in the proper proportions, as required by the specifications.

The Committee believes that separated aggregates undoubtedly lend themselves best to an accurate field control of the mixture. They are recommended for all important work when the supply is available.

Local conditions, however, make it inadvisable for the Committee to recommend the discontinuance of the use of mixed aggregates entirely at this time. For a great number of years a large portion of the aggregates used in reinforced concrete have been secured from natural river and lake deposits. Due to conditions peculiar to the manner of handling this material it does not appear practicable to separate the coarse and fine aggregates produced by this method. In the past this material has been of a fairly satisfactory quality. At the present time, however, a great deal of this material is inferior, due to the fact that there is a deficiency of coarse aggregates.

With proper care, crushed stone or other coarse material can be added to the mixed aggregates which have an excess of fines, and to bring the grading within reasonable limits of ordinary requirements for satisfactory concrete.

There is a large investment in docks, boats, and other equipment used in the production of river aggregates. It appears, further, that there would not be a sufficient supply of separated material available in this territory, under present conditions, to supply the demand, should the use of mixed aggregates be stopped.

The Committee also finds that there is a very great diversity in specifications regarding the maximum size of aggregates called for. The Committee feels that if the different sizes specified are reduced to the least number consistent with the desired requirements of concrete work, it should result in more accurately graded materials being available.

The determining of the grading of material by the Fineness Modulus method as developed by Prof. Duff Abrams of the Lewis Institute appears to be not only more correct from the standpoint of design than the specification of certain limitations on different screen sizes, but also a simpler and easier method, both from the producer's and from the designer's standpoint.

The Fineness Modulus herein referred to is the sum of the percentages in the sieve an-

alysis divided by 100 when the sieve is expressed as percentages coarser than the following sieves: No. 100, 50, 30, 16, 8 and 4, $\frac{3}{8}$, $\frac{3}{4}$, $1\frac{1}{2}$, etc.

The method for finding the Fineness Modulus of any aggregate is described in the pamphlet, "Design and Control of Concrete Mixtures."

4. Inadequate protection is the cause of the most spectacular failures. As this fact is well recognized, contractors pay more attention to this matter than to some of the others hereinbefore mentioned. This is particularly true of heating materials in winter.

But protection may be adequate to prevent a failure, and nevertheless be quite insufficient to give a concrete having the required strength.

The number of serious failures is fortunately very small, but reputable contractors occasionally "lose a panel" or part of a floor or roof. These contractors are very well aware of the necessity of heating materials in cold weather, but they become victims of sudden weather changes for which they have not made ready.

Although the manufacture of portland cement is well standardized, the Committee believes that in order to maintain a high, uniform quality of concrete it is essential that all cement be tested by a reputable laboratory, and that no cement be used until the results of such tests have been received and examined.

The above considerations lead us to urge that all users of concrete embody the following articles and clauses in their specifications:

1. Time of Mixing

- (a) Each batch shall be mixed for at least one full minute after all the materials are in the mixer. No dependence shall be placed on any assumed additional mixing which may take place during the chuting, handling, or pouring.
- (b) A suitable timepiece shall be mounted on the mixer and be in operation during all mixing, and the time shall be kept by such timepiece and not by counting revolutions of the mixer.
- (c) The mixer shall be adjusted to give a peripheral speed of about 200 feet per minute.

2. Consistency

- (a) The consistency of all concrete shall be controlled by slump cone tests made in the field.
- (b) The quantity of mixing water shall be adjusted at the mixer to give the desired slumps.
- (c) Concrete for footings, columns, beams,

and solid slabs shall have a slump of not to exceed 4 to 5 inches.

- (d) Concrete for small sections such as 4- or 5-inch joists, narrow and deep beams, mullions or ornamental work, shall have a slump of not to exceed 6 to 7 inches, additional cement being used to make up for the excess water.

3. Aggregates

- (a) Aggregates shall be uniformly graded from fine to coarse.
- (b) They shall be composed of clean, hard, durable particles.
- (c) They shall contain not to exceed 2 per cent of loam, silt, clay, and other coatings in accordance with A. S. T. M. tentative method T 136-22T.
- (d) They shall be free from an injurious amount of organic matter, as determined by A. S. T. M. method C 40-22.
- (e) For mass work, large sections and solid slabs, the maximum size of aggregate shall consist of elements passing a 2½-inch round screen or 2-inch square-mesh sieve.
- (f) For beams, columns, and medium-sized sections, the maximum size of aggregate shall consist of elements passing a 1-inch round screen or 1-inch square mesh sieve.

- (g) For joists and for thin or ornamental sections, the maximum size of aggregate shall consist of elements passing a ½-inch round or ½-inch square-mesh sieve.

- (h) Aggregates shall be controlled in the field by the Fineness Modulus method. A complete set of Tyler screens shall at all times be available and used to check the aggregates as received from the supply companies, and to determine the proper mixtures which are to be used in the mix.

- (i) All concrete aggregates, whether ready mixed or separated, shall conform to the requirements of Fineness Modulus given in the accompanying table.

- (j) In the case of specified sizes of aggregate, there shall be a 5 per cent oversize allowed above any specified maximum and a 10 per cent passing allowed through any minimum-sized screen specified.

Type of Aggregate	Maximum Size (Square Mesh Sieves)	Limiting Values of Fineness Modulus		
		Maximum	Minimum	Mean
Premixed	2"	6.20	5.60	5.90
	1"	5.50	5.00	5.25
	¾"	4.60	4.00	4.30
Separated—				
Fine	0 to No. 4	3.40	2.60	3.00
Coarse	¾ to 2 in.	7.60	6.90	7.25
	¾ to 1 in.	7.10	6.60	6.85
	¾ to ½ in.	6.50	5.90	6.20

Citizens Present Road Contractor with Cup

AS an expression of their appreciation of the rapid completion of the pavement on Main Street, the citizens of El Monte, Calif., presented the contractors, the Hall and Johnson Company, Los Angeles, Calif., with a silver cup. Considering the many complaints that are frequently heaped upon contractors, an expression of this kind is most unusual.

Besides being right in the business section of El Monte, Main Street is a part of the Valley Boulevard, which carries thousands of southern California tourists. Time was a most important element of the contract, and the contractors made the best possible use of it.

Construction of the pavement, which consisted of 150,670 square feet of 7-inch Vibrolithic concrete pavement built to a width of 60 feet, was started October 26 and completed November 21, 1925. Owing to the width of the street and the necessity for having part of it open to traffic at all times, the pavement was built in three 20-foot sections, the sections being separated by a ¾-inch expansion joint.

An additional contract containing approximately the same number of square feet and for the same type of pavement has since been awarded to the Hall and Johnson Company by the city of El Monte, giving added evidence of the satisfaction with the first job. El Monte is in Los Angeles



CUP PRESENTED TO THE HALL AND JOHNSON COMPANY BY THE CITIZENS OF EL MONTE IN APPRECIATION OF THE PAVING OF THEIR MAIN STREET IN RECORD TIME

County and is a suburb of Los Angeles. County aid was extended on the first contract.

Mariemont Subdivision Built with Tractors

Efficient Equipment Speeds Construction of Model Town

WHEN the Mariemont Company began the development work on the new residential community located nine miles from Cincinnati, one of the first big problems was that of economical transportation. This project embraced the construction of paved streets over an area of 600 acres and the erection of 750 houses and apartments for housing approximately 5,000 people. Materials used in this huge contract were hauled from the various supply yards to Mariemont with tractors and trailers.

chase of a second tractor and two platform Trailmobile semi-trailers of 5-ton capacity each. These were used for hauling lumber, lath, shingles, cement, tile, brick, and other building materials of all kinds. Soon the demand increased for greater quantities of lumber from the central warehouse to the different house jobs, and again the tractor was used. Working with two lumber-dump trailers, which leave their load in a neat pile, the cost of handling this type of construction material was greatly reduced.



**HAULING
CRUSHED STONE
FROM THE RAILROAD
FOR CONSTRUCTION
IN MARIEMONT,
OHIO**

The Fordson tractor is equipped with Firestone wheels, and the Trailmobile with dump body is equipped with Goodyear tires. A Burch unloader is busily transferring the crushed rock from a pit beneath the railroad car to the body of the trailer.

In July, 1923, a Fordson tractor equipped with rubber-tired wheels and two dump-body trailers of 2-yard capacity, was purchased for hauling stone from the quarry for foundations. Prior to its installation, stone was hauled with 1-yard dump-wagons and three mules. The new method greatly reduced the cost of hauling stone, at the same time increasing the tonnage of delivered materials.

When the streets were made, a tractor operating the grader cut the roadways and prepared the subgrade for paving. Crushed stone for the concrete pavements was hauled from the quarry a distance of 3 miles with the tractor, working with two dump-body trailers, which kept the delivery costs at a minimum. The success of this equipment led to the pur-

As each tractor is operated with two trailers, their hauling efficiency is greatly increased. There is practically no lost standing time for the tractor. While one trailer is in transit, the second is being loaded.

The enormous saving effected in the initial cost is shown by the fact that the four tractors with seven trailers complete cost but \$12,600, while the investment in heavy trucks necessary to haul the same quantity of materials would have amounted to approximately \$40,500, a net saving of \$27,900. Two more of these tractors were recently acquired, which, together with the original four, supply automotive power for every conceivable operation entering into the construction and maintenance of Mariemont.

Accident Prevention in the Construction Industry Pays Big Dividends to Labor, Contractor, and Owner—Help Collect Your Share of the Profits.

Efficiency in Concrete Road Construction—Part I

A Portion of a Report Made by J. L. Harrison, Highway Engineer, U. S. Bureau of Public Roads

IN order to adequately and intelligently discuss the organization and equipment of a concrete paving operation, it is necessary to define even so common an expression as "laying concrete pavement" before there will be any certainty that the reader will know what it means to the writer, or that conclusions as to equipment and personnel requirements, though they are based on extended field observations, will seem to be justified. Accordingly, the definitions printed on this page are given to show the operations covered by the phrase "laying concrete pavement."

The personnel and the equipment for a job depend on the methods in use and the efficiency with which these are carried out, as well as on the operations that are performed. It is therefore necessary to outline the methods on which a statement of personnel and equipment is made, just as it is necessary to outline the operations covered.

Whenever the rough subgrade is not at proper grade, the first operation should be to reduce it to grade. The grade, as now staked, is commonly the bottom of the slab at the crown. The "proper grade" is somewhat below this, as the elevation at which the quantity of material which must be taken out for setting the forms and for the thickened edges of the pavement, will be just sufficient to build the crown. If the rough subgrade is consistently high, but by moderate amounts, the blade grader

offers the simplest and cheapest means of reducing it to the proper grade. The grader may be pulled by a 5-ton tractor and when so operated will cut away and throw aside excess material expeditiously unless the subgrade material is too rocky or unusually tough. It will not, however, correct a low, rough grade. It is therefore a more common practice to use a plow and two or three fres-

noes on this work, as these will serve equally well to remove high areas and to carry material to low ones. One thing, however, should be emphasized. The current practice of setting forms before the grade is reduced, is cumbersome and needlessly expensive. It not only requires heavy hand trenching for the forms wherever the grade is high, but also the omission of a section of the forms every 100 feet or so to allow the fresnoes to reach the shoulders, and as a result the haul is needlessly extended because all the material must be moved through these openings rather than directly to the shoulders.

Moreover, the material so handled is commonly wasted, in piles, generally on one side of the road only, with the result that it must be either be rehandled when the shoulders are worked out or be left to mar the appearance of the roadside.

The force required for this work naturally depends on the amount by which the subgrade varies from the proper grade. A common organization is one plow team and two fresno

Definitions

1. Preparing Subgrade.—This covers all operations incident to converting a rough subgrade, which has previously been brought to the proper grade, to such shape and condition as is required for the placement of the pavement, but does not cover any work required in bringing the rough subgrade to the proper grade.

2. Handling Forms.—This covers all work incident to taking up used forms, cleaning them, moving, setting, aligning, oiling, and otherwise working with the forms.

3. Handling Materials.—This covers all work incident to unloading cars, storing or caring for materials, loading job transportation units, and unloading them into the mixer. It also covers the water-supply.

4. Hauling Materials.—All work of transporting materials and all work done on or in connection with the use and care of transportation equipment is included under this designation.

5. Mixing.—This includes the operation of the mixer and all work on the mixer.

6. Finishing.—All work of placing materials (puddling), finishing, covering, curing, etc., is included under this designation.



COMPLETING THE ROUGH GRADE ON A CONCRETE ROAD JOB

teams with drivers, a plow holder, and a foreman. Where a blade is used, the whole width of the subgrade has to be reduced, but when a fresno outfit is used, it is customary to reduce to grade only such a width of the subgrade as is needed for the pavement and for setting the forms. Even then the quantity of material to be handled is often so great that the above organization must be considerably increased, at least for short periods. But since it is advisable to maintain as nearly as possible the same force, these men at least should be regularly employed, and when they are not required on rough grading they can usually be used on shouldering and on the clean-up.

Preparing the Subgrade

The rough grade having been brought to proper grade (this being in fact a grading operation), the first operation incident to laying the pavement is to cut out for the thickened edge, at the same time cutting wide enough to take out most of the material that must be moved to allow the forms to be set. The proper tool for this work is a fairly heavy blade; and, while this can be drawn by horses, it is better to use a 5-ton crawler-type of tractor, as the operating space required is less, and the usefulness of the tractor in general service about the job is greater.

The forms having been set, the width of the subgrade on which the pavement is to rest may be thoroughly broken up by a scarifier and trimmed to correct section by a first-class subgrader, surplus material being removed by hand or by fresno, depending on the accuracy with which the rough grade was finished. In performing this operation, the subgrade should be left from a quarter- to a half-inch high and then lightly rolled by a light (1½- to 3-ton) roller, after which, to insure accuracy of cross-section, the grade of the forms should be checked and the subgrader used again with the blades adjusted to cut

to exact cross-section. Finally, a modern heavy fine finisher (often known as a subgrade planer) should be attached to the mixer to be dragged along by the mixer whenever it moves. If the subgrade is so dry or so solidly packed that it is not easily trimmed by the fine finisher, it should be heavily sprinkled under and about the mixer, and whenever necessary, the puddlers should stand on the finisher while it is being moved.

These operations of subgrade preparation require:

One blade grader, heavy-duty, 8-foot blade; one crawler tractor, 5-ton; one scarifier; one subgrader; one fine finisher; one light roller.

The labor requirements are: one tractor operator, who can act as subforeman; one blade operator; two laborers with the tractor; one roller operator; and one laborer at the mixer to take care of the fine finisher and perform miscellaneous tasks, particularly filling depressions in the subgrade, removing cuttings from the fine finisher and wetting the subgrade.

Form Setting

Form setting is a manual operation. No heavy equipment is required for it except, as noted above, that the blade grader should take out most of the material which has to be removed before the forms are set. The knack in setting forms is accuracy in preparing the bed on which they are to rest. This bed should preferably be cut a trifle low and topped with a layer of loose material, not over a quarter-inch deep, on which the forms rest just high enough so that they must be tamped and worked a little to bring them to exact grade. A proficient laborer can trim out the bed to within a quarter of an inch of the correct level, easily and rapidly. If an effort is made to trim exactly to grade, high spots are certain to be left, with the result

that sections of the form will have to be removed to work them down. On the other hand, if the bed is cut too low—a half-inch or more below the correct level—the material under the form must be tamped. This may take the time of one or two extra laborers, and there is the added disadvantage that it is seldom so thoroughly done that the forms can be depended on to hold grade.

If the practice of cutting the bed just below grade and setting forms on a thin layer of loose material is followed, three men—one to cut the trench and two to set the forms—are all that are required to set and align 1,000 feet of forms a day. Besides this, two laborers are required to take up used forms and load them on the wagon in which they are hauled back and distributed to the form setters. A team and wagon is better and cheaper for this work than a truck. It can get over the shoulders and through the ditches better than the truck; and the greater speed of which the latter is capable on good roads is of little advantage in this work because of the time consumed in loading and unloading as well as the bad going. In spite of the fact that it is cheaper to use a team for this work, however, many contractors use a truck, because the men do not like to be bothered with the care of a team, which, of course, involves extra work after the regular day's work is over. Where there is no other horse-drawn equipment on the job, the best solution is to hire a reliable local man with his team. This relieves the contractor and his foremen of the necessity of looking after a single unit requiring attention after regular working hours.

The work of moving the forms commonly takes less than the full time of the above force; and it is therefore available for such other duties as cleaning and oiling the forms,

for setting forms when this is necessary, or for any other miscellaneous duties that may be required of them. In addition to the laborers, a foreman is needed to keep things moving smoothly. As the form-setting and the subgrading are closely related, it is well to put a good foreman over the two operations, allowing him to use the tractor operator as a subforeman in charge of subgrading operations in his absence.

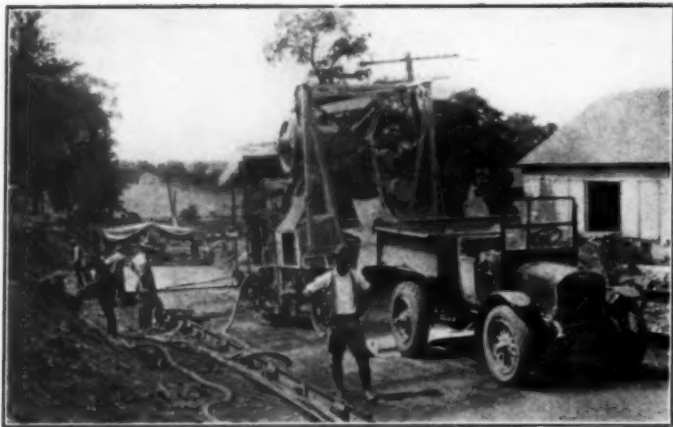
In this connection a word may be said as to foremen. Some contractors want what they term working foremen—that is, foremen who work with the men, doing much the same tasks and assisting generally in the ordinary work of the day. This is a poor practice. Keeping a dozen men effectively at work is task enough to demand the whole attention of any ordinary foreman; and if high efficiency is to be attained in pavement construction, it will generally be helpful to make this clear to all foremen. They should understand that they are employed to keep the men under their direction at work, and the work for which they are responsible moving smoothly, and that, no matter how hard they may work themselves, unless they actually accomplish this, their value is lost. The practices here noted require one wagon and one two-horse team. The labor requirement is one foreman, one laborer to cut trench for forms, two laborers to set forms, two laborers to remove forms, and one teamster.

Handling Materials

Generally speaking, the most satisfactory material plant is an oil or gasoline crane of the crawler type with a $\frac{3}{4}$ -yard bucket (a 1-yard bucket is needed if a high rate of production on the basis of a 6-bag batch is to be had) and a steel bin equipped with a modern fast-dumping, batch-measuring or weighing device. Steam-driven equipment, whether

A SUBGRADE
AS PREPARED BY
THE METHOD USED
IN EFFICIENCY
WORK





A TWO-BATCH
TRUCK MAKING
DELIVERY TO MIXER
SKIP

rollers, cranes, or mixers, is out of date and expensive to operate. It commonly requires an extra man to fire each unit, often a team to handle the water-supply, and sometimes another to deliver the coal; and time is lost in taking on water and often in taking on coal also. The time worked per day is, for this reason, commonly less than can be had from gas equipment, and the labor and auxiliary equipment required is commonly more expensive. With most types of heavy equipment there is, to offset these differences, no corresponding increase in production or decrease in any other item of the operating expenses.

At the cement house a belt conveyor should be used for elevating the sacks to a point where they can be emptied into hoppers from which the cement can be discharged into the delivery equipment. A sack cleaner and a sack baler should also be installed here, their operation requiring the time of one man. If the cement is sent out sacked, the sacks must be collected and returned to the cement house, a considerable part of the time of one man and a light truck driver often being used on this work. To what extent this is an additional item of expense depends somewhat on whether other conditions surrounding the job are such that a service truck with driver and helper must be maintained in any event. As sending the cement out sacked is not an efficient method of handling it, no provision is made for it in the minimum labor and equipment schedules.

At the mixer the trucks must be turned around before they can be backed to the mixer and dumped. This may be done by backing the trucks, but, as on high hills or in deep cuts the room available is limited, it has generally been found more practical to use a

turntable. One man is required to operate the turntable, and from time to time the tractor is sent back to move it forward out of the way of the mixer.

Turntables are commonly designed to accommodate only one style of trucks. This is regrettable, as it is often to the advantage of the contractor to hire a few extra trucks and it is not always possible to secure these, particularly in the heavier types with a wheel-base the same length as those regularly used. As the practices of any well-organized job become so well established that the initiation of non-uniform practice in handling a few trucks tends toward disorganization, available equipment is not infrequently rejected, merely because it cannot be handled on the turntable. It should be a simple matter to equip the larger sizes of turntables with an easily controlled truck-positioning device which would make it possible to use the turntable in handling trucks of a number of different sizes. If this were done, the contractor's problem in hiring extra transportation to meet extra-long hauls would be considerably simplified.

At the mixer one man is needed to help in dumping the trucks. The end gate must be released to allow the truck to discharge its load, and after the load is discharged the gate must be closed and locked. Often a little material not deposited on the skip must be salvaged.

For handling the water, which is, of course, one of the materials, a pump is required. The supply of pipe will depend entirely on local conditions, but in general practice at least 20,000 feet of 3-inch pipe with fittings and a take-out connection for every 300 feet of pipe line should be available. If take-out connections are provided every 300 feet, the equip-

HANDLING MATERIALS AT A LOADING PLANT

On this job stock piles were located about every two miles, and a gas shovel with a clamshell bucket and crawler traction was used to keep the bins filled. Notice the man in front keeping a record of the time of departure of the trucks, in an effort to speed up delivery



ment for water delivery would include two lengths of 2-inch pressure hose about 175 feet long to feed the mixer, and to prevent loss of time in changing hose the mixer should be provided with a double hose connection so that the second hose can be connected before the first is disconnected.

The pipe is commonly laid before mixing starts and during the move from one mixer set-up to the next. When laid in this way, labor and transportation equipment which otherwise might be idle or assigned to more or less non-productive work is used. Though pipe must be maintained in position for some days after the concrete is placed, in order to furnish water for curing, it generally is possible to synchronize removal and relaying operations with the mixing operation, at least to such an extent that the amount of work to be done on the pipe line when a move is made, is materially reduced. In the interest of prompt moving the relaying should be entirely completed before the move is begun. To make this possible, the quantity of pipe and fittings which will be required should be calculated before the job is started, and the correct quantity of pipe should be sent out. If this is done, removal and relaying can be so handled that the pipe line will never delay the mov-

ing, and when handled in this way the time of two men is all that is required. Generally, no extra transportation is needed, as the team used for hauling forms can ordinarily find time to move the pipe also.

Finally, to keep the supply of all materials running smoothly, it is well to place this work under the direction of a good foreman. It is one of the outstanding important elements of the job and should be carefully supervised.

Handling materials, including water delivery, under these practices will require the following equipment: one crane, crawler type with $\frac{3}{4}$ -yard bucket; one steel hopper with modern batch-measuring or weighing device; one cement house with cement-loading bins; one belt conveyor for cement house; one sack cleaner; one pump, 100-gallon capacity at 400 pounds pressure; 20,000 feet of 3-inch common steel pipe with fittings; 350 feet of 2-inch pressure hose in two sections; and one turntable.

The labor required is as follows: one plant foreman, one crane man, one hopper operator, one extra man to help unload cars, three cement handlers, one laborer to clean and bale sacks, one pump operator, two laborers to handle and lay pipe, one turntable operator, and one truck dumper.

(To be continued in June issue)

SPARE PARTS ARE FOR MACHINES NOT MEN

While money will buy a lot of things it won't buy spare parts for your body that will be as good as the original, comments Frank J. Mayer of the National Safety Council.

Quick-Hardening Concrete from Portland Cement

Simple Methods Accomplish the Results

CONCRETE work is usually allowed to stand many days before it is used. Quite often, however, time is the important consideration with new or repair work. In such cases the builder does not want to wait the usual length of time for concrete to reach the desired strength, and it is not necessary for him to wait. According to the Universal Portland Cement Co., Chicago, Ill., which has been carrying on extensive tests, the same quality portland cement that the contractor has been using can be used to secure quick-hardening, strong concrete in three days.

High early strength concrete is particularly desirable on many jobs, such as special foundations and repair work that must be placed in use within a few days, sidewalks and street work where traffic or business demands that the improvement be placed in service in the least possible time. With winter construction it is desirable to get sufficient strength quickly to prevent the concrete from being damaged by freezing and to reduce the time of and the cost for protecting from freezing. In such cases the slight extra cost of quick-hardening, strong concrete in three days is justifiable.

Results Not Difficult to Obtain

To obtain this high-strength concrete in a few days, all that is necessary is to proportion, mix, place, and protect the concrete in the manner that actual construction experience and thousands of laboratory tests, extending over a period of more than five years, have demonstrated give the desired results. By using these methods, a concrete pavement was built with portland cement at the Chicago (Buffington, Ind.) plant of the Universal Portland Cement Co. This pavement was opened to traffic when less than three days old and since then has been subjected to continuous heavy-truck traffic without any damage to the concrete. Concrete of this quality is obtained by simple methods, the most important of which is decreasing the proportion of mixing water and increasing the proportion of cement. Other factors contribute toward giving a three-day strength that is as great as the ordinary 28-day strength. The factors which give this quick-hardening, strong concrete in three days are as follows:

1. Decrease the amount of mixing water. Stiff mixtures must be tamped in place.
2. Increase the amount of cement.
3. Increase the mixing time.
4. Place concrete at a temperature of at least 70 degrees Fahrenheit.
5. Keep concrete at a temperature of at least 70 degrees Fahrenheit for three days.
6. Keep concrete damp for three days.
7. Use calcium chloride where tests show it increases strength.

A good concrete such as is commonly used in building construction work is proportioned one sack cement to $2\frac{1}{2}$ cubic feet of good sand and 4 cubic feet of crushed stone or pebbles, graded in size from $\frac{1}{4}$ -inch up to $1\frac{1}{2}$ -inch material. If to the material figured dry, 7.7 gallons of water for each sack of cement is added, this including the moisture in the aggregate, and the mixing time is one minute, a concrete, "A" in table, will be produced with a compressive strength of 240 pounds per square inch for one day, 750 pounds for three days, 1,320 pounds for seven days, and 2,600 pounds for 28 days. This concrete had an approximate slump of 6 to 8 inches.

Concrete "C" in the table above is the same in every respect as concrete "A," except that the volume of mixing water has been reduced from 7.7 to 6.1 gallons per sack of cement. This one change produces an increase in three-day strength of 600 pounds, or 80 per cent. It will be noted that the use of less mixing water increases the strength of the concrete at all periods. Similarly, it will be noted that with a $1:1\frac{1}{2}:2\frac{1}{2}$ mix concrete "D," when the mixing water is reduced from 5.5 to 4.4 gallons for concrete "E," the strength is increased.

The effect produced by increasing the amount of cement is shown by concrete "D" in the table. This has 0.7 of a barrel more cement per cubic yard of concrete than concrete "A," but this increase of only 50 per cent in cement more than doubles the three-day strength. While concretes "A" and "D" have a different water content per sack of cement, they have the same slump. Mix "D" has less total materials per one-sack batch than mix "A" and therefore requires less

AVERAGE RESULTS OF SEVERAL THOUSAND TESTS OF VARIOUS MIXES OF CONCRETE

Mix	Bbls. Cement per Cu. Yd. of Concrete	Gallons Water per Sack of Cement*	Approx. Slump Inches	Lbs. Ca Cl ₂ per Sack of Cement†	Minutes Mixing Time	Compressive Strengths Pounds per Square Inch			
						1 Day	3 Days	7 Days	28 Days
A	1-2½:4	1.4	7.7*	6 to 8	0	240	750	1,320	2,600
B	1-2½:4	1.4	7.7*	6 to 8	0	340	910	1,550	3,030
C	1-2½:4	1.4	6.1*	½ to 1	0	520	1,350	2,090	3,700
D	1-1½:2½	2.1	5.5*	6 to 8	0	560	1,580	2,530	4,230
E	1-1½:2½	2.1	4.4*	½ to 1	0	880	2,410	3,630	5,250
F	1-1½:2½	2.1	4.4*	1	0	1,150	2,860	4,020	5,740
G	1-1½:2½	2.1	5.5*	6 to 8	2‡	930	1,880	2,610	3,800
H	1-1½:2½	2.1	3.4*	0 (Dry)‡	2‡	1,910	3,380	4,200	5,260
U	1-1½:2½	2.25	4.6*	½ to 1	0	1,580	(Concrete used in road at U. P. C. Co.)		

*Total water, including the moisture in aggregates as used.

†In using calcium chloride (CaCl₂), thoroughly dissolve 100 pounds CaCl₂ in water so as to give a total of 50 gallons of solution. Replacing 1 gallon of mixing water per sack of cement with 1 gallon of this solution gives right amount of and right method of using CaCl₂.

‡Stiff mixtures must be tamped into place.

water per sack of cement to wet the material to the same consistency. The workability of "E," however, is even better than that of "A" because a concrete rich in cement is easier to place and therefore is more workable than one having the same slump but less cement per unit volume.

Mixtures rich in cement and with a comparatively small amount of mixing water require thorough mixing to insure a uniform concrete. By increasing the mixing time as between "B" and "A," and "F" and "E," the strength is increased. For machine-mixed concrete the mixing time should never be less than one minute, and any added mixing time up to five minutes improves quality and increases the strength of the concrete.

Good concrete, such as "A" in the table, ordinarily has a strength of 2,000 pounds or more at 28 days. Two simple changes, as noted above, produce a concrete with a strength of 2,000 pounds or more in three days. These two changes are, decreasing the volume of mixing water and increasing the quantity of cement. Still higher strength concrete at three days is obtained by using standard portland cement and adding two pounds of calcium chloride per sack of cement, as in concrete "G," which should be compared with "D." Further reducing the volume of mixing water as in "H" and increasing the mixing time with the added calcium chloride further increases the strength. Concrete such as "H," however, which is very dry, must be tamped into place.

Use of Calcium Chloride

The best way to add calcium chloride in the

field is to add 100 pounds of commercial calcium chloride to about 40 gallons of water in a barrel of at least 50 gallons capacity. Stir until the calcium chloride is thoroughly dissolved, add sufficient water to make 50 gallons of solution, and a standard solution with 2 pounds of calcium chloride to a gallon of water is obtained. Replacing one gallon of mixing water per sack of cement in a batch of concrete with one gallon of this standard solution gives the right amount of calcium chloride and the right method of using it.

Effect of Temperature and Curing

The results shown in the table are for concrete placed and maintained at a temperature of at least 70 degrees Fahrenheit for the time indicated. Further increasing the temperature of the mix and the temperature during the curing of the concrete and at the same time keeping the concrete damp will give still greater strengths than are shown in the table. The use of steam at a few pounds boiler pressure for curing will also greatly accelerate the rate of hardening of concrete and increase the three-day strength. Steam is available and may be used to advantage in many places and on many jobs.

High, early strength concrete is particularly desirable during the fall and winter and early spring months, as such concrete has sufficient strength to resist being damaged by freezing much earlier than concretes proportioned, mixed, placed, and handled in the ordinary manner. This high, early strength concrete requires protection from freezing for a shorter period, which is desirable from the cost standpoint.

**Always
Be
Careful**

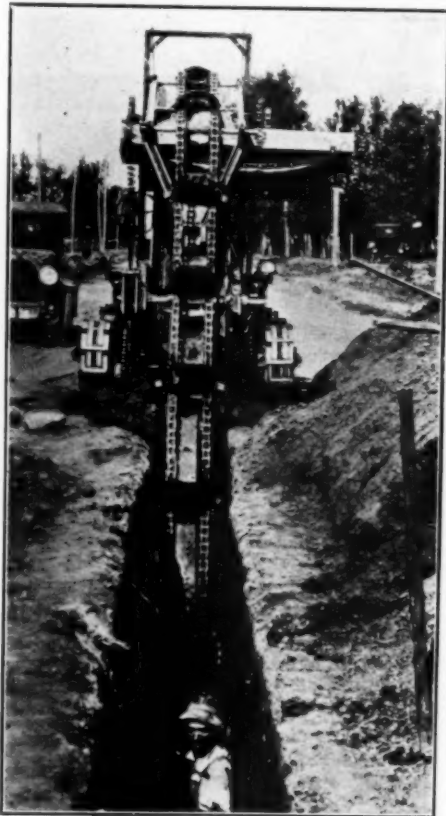
**Safety Measures on Construction Jobs
Pay High Dividends**

Tractors Replace a Hundred Men on Ditch Job

Examples of Savings by Contractor and City

FROM San Antonio, Texas, comes an interesting story of a contractor who has made ditch-digging contracts pay big dividends by using a Fordson-powered excavator to replace day labor. Even though laborers receive but \$1.50 a day in southern Texas, the Fraser Construction Company has cut the cost of excavating \$150 a day since the Topping ditch digging machine was put into service equipped with Gridiron grip wheels. On one job a 10-foot ditch 2 miles long was dug through the city of San Antonio. In spite of the frequent changes and resetting of the machine necessitated by reason of the numerous gas and water pipes crossing the line underground, the work was completed at a saving of some 50 per cent over the estimated cost of performing the task by hand shovels. Where no obstructions are encountered, this fast-cutting machine equals the work of 100 day laborers. On this basis the ditcher will pay for itself in a very few weeks.

Another noteworthy example of trench excavating with this tractor power is found in the city of Huron, S. Dak. In this case the tractor operating a Topping excavator with Haiss traction was used for digging trenches in preparation for laying gas, water, and sewer lines. The city has saved from 30 to 40 per cent for this work over the usual cost when let to contractors. On an average, the machine will dig a 6-foot ditch 30 inches wide and 400 feet long in 10 hours with only 4 men on the job. Previous to the applying of the tractors to this work, it took 18 men the same length of time to dig the trench at a cost of about \$1 a foot. This expense has been reduced to 60 cents a foot with machines. Such records of economy and mechanical efficiency are a source



TOPPING EXCAVATOR WITH FORDSON POWER AND HAISS TRACTION IN SERVICE IN HURON, S. DAK.

of never-ending satisfaction to concerns engaged in trench digging.

How to Arbitrate

THE American Arbitration Association, 342 Madison Avenue, New York City, which is a consolidation of the Arbitration Foundation, Inc., the Arbitration Society of America, Inc., and the Arbitration Conference, has just issued its first Information Bulletin. It contains a word regarding the consolidation of the various arbitration organizations, the United States Arbitration Act, a bulletin on how to arbitrate, a standard arbitration

clause, rules and forms of procedure, Federal departmental activities in the field of arbitration, state legislation relating to arbitration and trade, commercial and professional organization arbitration development.

A copy of this information bulletin may be secured from the American Arbitration Association by any one interested in this effective method of settling industrial misunderstandings.

Economic Reasons for Winter Letting of Road Work

By J. H. Mullen

Vice-President, Nelson, Mullen, Nelson, Inc., Minneapolis, Minn.

ONE objectionable feature of road construction contracting as a business is that for about six or seven months of the year those engaged in the business are marking time, practically doing nothing, and during the other five or six months are feverishly engaged in trying to obtain work, in preparing for it, and endeavoring to carry it through. All because the bulk of the contracts are let after the construction season opens. We know this to be so in the case of from 80 to 90 per cent of the work; but what are we going to do about it? In my opinion the thing to do is to get behind a movement to educate the public in these matters, and to see that the officials in charge are supported in arranging that contracts for construction are let in the fall or winter, so far as possible. And you may be sure that the highway officials will be in accord with such a move. A few of the states have inaugurated this policy, but a large number have not done so, because the political situation is such that the departments cannot plan sufficiently ahead and are obliged to wait until winter time to determine their layout and make surveys and plans for the following year.

Highway construction in the northern part of the United States is, of course, a seasonal operation, and in more than 25 of the 48 states the period for actual construction cannot be safely figured at more than six months. In many of these states most of the road contracts are not let until after the beginning of the construction season. It is evident that this is an uneconomical procedure, for there is a very considerable amount of preparatory work that must be done after the contracts are let, which could be done to great advantage during the winter and spring months. It is therefore

not only in the interests of economy but also with a view to stabilizing the road construction industry that highway officials, especially in the northern states, are urged to award road contracts in the fall and winter previous to construction.

It Takes Time to Choose Suitable Equipment

One of the primary factors in successful road contracting is the selection of suitable equipment, for machinery enters very largely

into present-day methods of road building, and the fact that mechanical operation is rapidly supplanting hand labor in road building, is well exemplified by the wonderful exhibits of labor and time-saving equipment at the Road Shows. There are naturally some kinds of equipment more suitable and ef-

ficient than others for a given project. It is logical, then, that if awards are made so that the contractor knows in the winter what the nature and extent of his work will be for the following season, he is more certain to deliberately study his requirements and work out his equipment organization to the best advantage.

This phase, of course, has a direct bearing on the equipment industry, which has to carry heavy peaks of production and shipment due to the rush of orders resulting from late lettings. This does not facilitate the efficient operation of the equipment industry and frequently results in substitutions which are not satisfactory to the contractor or suitable for the work.

Production of Aggregates

It is estimated by the National Sand and Gravel Producers Association that in the states whose programs are affected by cold

It Takes Time To—

Choose proper equipment after the contract is let.

Produce aggregates, as these are not ordinarily produced until the contract is let.

Build up your organization; but this can be greatly reduced if winter work makes it possible to hold over all the important foremen and superintendents.

Attend to the miscellaneous details connected with a contract.

These are a few dozens of reasons for winter letting of road contracts.

weather there was used for paving in the past year over 80 million tons of sand, gravel and crushed rock. This class of material is not generally produced until after contracts for construction are awarded, and it has been the experience of every state which started a substantial program in the spring and early summer that shortage of cars and material occurred during the time that working conditions were best, which meant a serious loss in time and money. This alone warrants the early letting of contracts so that gravel and rock producing plants can be made ready and a portion of the materials produced, shipped, and stock-piled. Doing so would result in reducing the cost of material, through more efficient and continuous production, and would avoid congestion and shortage of shipping facilities with its attendant expensive delays and inconvenience on the work.

Advantageous to Hold Organizations Through Winter

In the seasonal operation of road construction contracting it is necessary to lay off most of the employees for several months of the year. The uncertainty of the following season's work makes it unwise to hold these men, but if the work were let in the fall or winter, contractors would be able to hold their best men in line for the following year and to organize their main personnel during the winter and early spring. All contractors have had the experience of developing an organization of reliable and efficient men which they have been unable to hold together from year to year because of the uncertainty of work and have found when the lettings come on in the early summer that these men have been forced to seek other employment during the idle months and are not available when needed. The process is repeated every year and is costly to the contractor and detrimental to the men, who, if given continuous work with the same organization, would become more proficient in their individual lines, thereby increasing the earning capacity of themselves and their employers. This can be accomplished if plans for the next season's work are formulated well in advance of the construction.

Miscellaneous Important Details

In addition to the selection of new equipment to fit the work, the preparation of necessary materials, and engaging the nucleus of the construction organization, all of which can be facilitated by winter letting of contracts, there are a number of things which the

contractor must do after obtaining the work, and which can be done to advantage well in advance of the actual construction. Camp sites must be secured and camp buildings prepared; sidings and storage facilities when necessary must be arranged for; equipment must be transported to the work and set up; stock must be selected, and feed and other supplies located and arranged for. Such work can all be done before the working season.

Fall and Winter Lettings Help Every One

Highway officials will generally agree that the economies herein stated can be effected by fall or winter letting of work, and those having larger programs go further, and say that early lettings make for more efficiency in the administration of their departments. It gives them the opportunity to provide for inspection and selection of materials during the winter and spring, and to organize their engineering forces early, enabling the selection of the most suitable men for resident engineers for the various classes of work to be done. It is admitted also that no matter how good the highway organization may be there are always items of preliminary work, such as right-of-way easements, plan revisions, etc., which are still left to be done after contracts are awarded.

Contractors Should See Sites Before Snow Flies

In the extreme northern states where the ground is covered with snow during most of the winter time, the work should, if possible, be let in the fall, or if it is not suitable to have the lettings at that time of year, the highway department should outline the program of construction on which awards are to be made during the winter, early enough in the fall so that contractors or prospective bidders may have an opportunity to go over the ground to determine physical conditions before snow interferes.

It would be useless to attempt an analysis of the cost saving that might be made by advancing the time of road lettings, for this is one of those intangible things which cannot be estimated in dollars; but, in the light of sixteen years of experience in charge of work on "both sides of the fence," I have no hesitancy in saying that, in the territory affected by cold weather, the letting of road contracts in the fall and winter instead of in spring and summer would result in much greater efficiency and economy.

—ACKNOWLEDGMENT.—From a paper read before the American Road Builders' Association, at Chicago.

Management—The Contractor's Fundamental

By James S. Frear

"**H**OW did you manage it?"—The question that so often follows the stating of some business problem that has been used as a topic of conversation. The unconscious expression of one of the fundamental factors of any business, but particularly of the contracting business. I say "particularly," because of one fact: the contractor deals more exclusively with the personalities of labor than does any other business or profession. Contracting is primarily a matter of labor and materials, with labor appearing in the major relation.

With all the other forms of business which the world knows, contracting has also seen the gradual changes of condition which have come upon us. The very capabilities of the craftsmen employed have undergone great changes within the past few years. These things have meant an adjustment upon the part of the employer; the solving of a problem in management. We have had to change with them; else we should have been proved as unyielding as the man who denies that anything has changed or advanced.

Much as we may have pulled back on the traces, there has been that gradual advance which is the course of all industry. It continues, not because of what we do, but in spite of it. Such a condition of affairs leads to a consideration of what changes the future is going to thrust upon us. If we think clearly, then we shall be in a position to guide through these changes. If we ignore the changes that have already taken place, then we shall awaken to find another hand guiding the bark of progress.

Under our existent economic condition there is a constant apparent war between capital and labor—a resultant of a gross misunderstanding of the relations of one to the other; a lack of knowledge on the part of the man who invests his dollar in place of his labor—or the one who invests labor in place of cash. Both have rather misunderstood each other's relation; and it has been the binding link of management which has held them together, working toward the advancement of all of society.

Regardless of where we are leading, or of what we are to meet and overcome within the

next decade, the storm center around which all of the battle will be waged will be management. If this be good, then it will tend to eliminate or reduce the intermittent troubles which will arise. If it be bad—and we must acknowledge that some will be—it will attempt to stifle rather than to settle equably such disputes as will inevitably arise. The guiding of the economic trend is solely in the hands of those who administer the service known as management.

Forgetting the past, which has been too greatly concerned with smoothing over immediate difficulties instead of finding the causes and effecting a correction, we must embark upon a newer administration of this factor. Instead of continuing to talk and think upon the partnership theory, which has been the outcome of this condition, there needs to be a reorganization of the business of contracting that is in accord with the new forces which are making themselves felt. These influences are along the lines of sound economic laws and the principles of effective productivity. The greatest production possible from the laborer; the greatest possible return upon invested capital; the greatest reward to the laborer. These are effective factors of management which will lead into the consideration of more intricate problems connected with the advance of industry.

We are laboring under a system that is wasteful in every particular, and which has inefficiency as an inherent factor. A definite change must come and is coming. Management must make these changes if there is to be any justification for the foundations of the present system. If management fails, then the changes will come from other sources, and they may be surprising ones at that.

We have four existent party relations that are deeply concerned with the continuance of the present system, and in its gradual, but certain, advance. The general terms which have been most commonly applied to them are the investor, the manager, the worker, and the public. You will note that the obsolete terms of capital and labor have been disregarded. The investor may be the management; but, whether this be true or not, the

management must be above any consideration of property rights if he is to exert the proper managerial function. The public, in the aggregate, is the investor, manager, and worker. Their copartnership has ever been existent, but has been ignored in the efforts of each to gain an advantage of the other.

Contracting, more frequently than any other business, is governed by a single man who is also the controlling owner. Through this fact he has to exert the influences of both ownership and management. Such a condition places upon the management of a contracting business more of a determining nature than is usual in other lines. With so much more hinging upon the factor of management, there is the greatest possibility that it may not function in as efficient a manner as where otherwise applied.

In management is vested the power and intelligence to bring all parties together for the endurance of our system; this with the idea of producing the maximum output in the minimum time and with the minimum of material outlay. To this fundamental is also given the power to return to investor, management, and worker alike a reward in accordance with the true value of each. This is at present hindered through the fixing of both labor return and output by forces entirely beyond the management control. It also means that management must return to the fundamental economic laws for its governing theories.

As at present constituted there is no system which fixes a definite and common unit of measurement whereby the effort and return of labor can be gaged. Such a condition is essential to the effecting of any form of permanency to the business to which we are devoting so much of our lives. Rendering a service which is so needed, we have been placed between the upper and nether millstones of materials and labor; grinding ourselves in unnameable ways, there is full need of some method whereby we may effect a change.

The wastes must be eliminated through effective management in order that the public's burden be reduced. A plan of measurement which will permit increased efficiency must be established. If management carries this idea to its ultimate conclusion, the time will come when the same unit of labor will attain the same unit cost in every locality. This is fundamentally sound. A yard or a pound has the same length or weight, whether it be in Portland in Maine or Oregon. A horsepower is the same in Chicago as it is in New Orleans. These units have been standardized.

Those of labor output and unit return could be established with equal facility if we were to drop the fallacy of the "human element."

I once managed a large office where the stenographers received their letters through phonographic cylinders. About so much work was produced every day. A management survey revealed the fact that one typist, considered the most efficient, was the lowest in point of hourly production. Several types of standardization were attempted, and the unit eventually established was based wholly upon typed lines. No word was given the workers of the changed type of managerial function, but the wage scales slowly adjusted themselves to the new basis, the producers being given increases, the others remaining stationary. The human element was reduced to a minimum, the stated output being the real and efficient basis determined as indicative of labor value.

That, in a measure, has been tried in the contracting industry as well. Here, the time standard is the really efficient and workable one. What is desired is eight hours of work for eight hours' pay. Such a standardized productivity means that we will have a basis upon which to gage the costs of the work which is to be done. The managerial function is to see that every worker is so placed that he is able to produce work of a standard quantity and quality. This means the effectual elimination of waste hours. It means an arrangement of the work in such a manner that delays are eliminated. It means the elimination of such a condition as was noted on a job not long ago; a large floor was being laid and of six carpenters working, two were always idle; not always the same two, but always the same number. Management was at fault in not seeing that each man produced while on the job, instead of paying him for "rest periods"—and the public forced to pay the bill while muttering about "high building costs."

More is dependent upon efficiency of management than upon efficiency of labor. If management fails to demand that labor make a standard return, then the old system holds sway, and one member of the relation is again seeking an advantage of all of the others. If there is to be a change in condition, it must certainly be a change in management itself. Our only manner of justifying ourselves for being placed in administration of the managerial function is to so administer it that there will be a fixed and standard return based upon an established unit. This is a certain result of good management.

Conveyors Speed Up Road Building in Ohio

River Gravel Handled by Stiff-Leg Crane and Conveyor System

By George F. Paul

BOTH permanent and portable conveyors are being used to good advantage in handling tons of gravel taken from the bed of the Ohio River for use in surfacing and maintaining roads in southern Ohio. The gravel is brought in from the river by barges and unloaded by a stiff-leg crane on a barge. The highway officials designate where the gravel is to be stored, and it is carried to these places by means of a long permanent conveyor and two Barber-Greene portable conveyors.

The clamshell bucket operated by the stiff-leg crane takes the gravel from the barge and

stored in one pile with only one set-up of conveying equipment. When the outside storage pile is completed, the 60-foot conveyor is moved back a few feet and another semicircular pile is built, and the slack in the discharge end of the permanent conveyor and the hopper end of the 60-foot conveyor is made up by adjusting the 45-foot conveyor to discharge again into the hopper of the 60-foot conveyor.

When the gravel in one section of the river is exhausted and moving time comes again the conveyors are knocked down, loaded on barges, and moved again along with the



EQUIPMENT FOR HANDLING GRAVEL FROM RIVER BARGE TO STORAGE PILE

At left is shown complete layout with the exception of the second portable conveyor. At right, end of 200-foot stationary conveyor with two portable conveyors shown zigzagged in background

loads it into a large receiving hopper, set up on the river bank over the lower end of the 200-foot permanent conveyor. Sometimes only 150 feet of the permanent conveyor is used, this depending on the distance that the material is to be carried from the river edge. From the hopper the gravel is spread uniformly by means of a regulating gate under the permanent conveyor. The permanent conveyor discharges onto a 24-inch x 45-foot portable conveyor, which in turn discharges onto a 24-inch x 60-foot portable belt conveyor. These portable machines are equipped with trucks having swivel wheels, so that the conveyors can be moved in semicircles about their hoppers. Thus a semicircular pile can be built up instead of the usual cone-shaped pile. With the two portables, the material can all be

dredging equipment.

The 200-foot conveyor ordinarily would be equipped with a 5-ply belt and $\frac{1}{8}$ -inch rubber covering on the carrying surface. Here it was desirable to have the belt as light as possible, because it had to be rolled up quite often and set up again, so a 4-ply belt with a $\frac{1}{16}$ -inch rubber cover is used. Power is furnished by a gasoline engine. On the 200-foot conveyor a 4-cylinder, 38-horsepower Hercules engine is used, and on each portable a Buda WTU 28-horsepower 4-cylinder engine is installed. H. A. Carpenter of Marietta, Ohio, gravel contractor, reports that the conveyors are able to take care of the maximum capacity of the clamshell, and with the entire outfit working steadily he has been able to unload and store 8 barges of gravel in 8 hours.

Efficient Insurance Against Unreliability

By G. Szmak

Managing Engineer, Universal Engineering Company, Bridgeport, Conn.

THE query "What is the matter with the construction industry?" is being asked with such rapidly increasing frequency that it should no longer be overlooked as idle talk. It may be said that the trouble is nothing more than that which overtakes every industry in its progress, namely, the need of conforming to surrounding conditions during every particular cycle of its existence.

No industry is any better than the lowest standard of its participants—help elevate.

The Line of Imaginary Least Resistance

The most popular cure-all used to-day against unreliability is surety bonding. This reminds me very much of certain persons who are quite willing to subscribe to any church, it matters not which one, to gain their salvation, although they have not the least inclination for effort which would put them in contact with the great universal spirit and thereby merit happiness on earth. This, of course, only proves man's greatest failing—his inclination to follow the line of imaginary least resistance. We avoid all effort of thinking, courage, and action, but are quite willing to pay the price, no matter how dear, to any one who will shoulder the responsibilities of our neglect. We all recognize this great failing at some time or other and also the relatively high prices that are paid, but before we do, we have to be pushed and kicked into the line of straight thinking.

Evil Effects of Unreliability

Does surety bonding eliminate any of the following evil effects of unreliability?

- (a) 1. Consideration of price first.
2. Bids at apparent net cost price but really skin prices.
3. Award of work to Class "C" bidder, even though qualifications are of a low standard.
4. Competitive bidding on quantities and qualities instead of prices for specific items.
5. The foolishly low bidder and also the safety first bidder.
6. Subcontractors' bids based largely upon guesswork with a large factor of safety added because of inability or unwillingness to figure quantities with care, especially without recompense and mostly not even a possible chance of award.
7. Unnecessary competition beyond reasonable limits.
8. Requesting bids with view to reducing the cost of high-grade materials and workmanship.
9. Wasteful competitions of architects, contractors and dealers without fees.
10. The expense of preparing information for estimates by 100 or more contractors, subcontractors and dealers, when reliable information can be secured from 10 to 25 sources, sufficient to complete any estimate.
11. Preparation of estimates known to be inaccurate in advance through intentional laxity in interpretation of plans and specifications, survey of quantities, clerical errors, etc., in order to receive consideration or win a job.
12. Preparation of estimates in many instances with numerous alterations which expert knowledge of costs or even reasoning and judgment would be sufficient to know in advance as greatly beyond appropriation or expected cost.
13. The expense of surveying and estimating on speculative projects without remuneration.
14. Class "C" service in competition against Class "A."
- (b) 1. Disputes with every branch of the industry due to misunderstandings and unfair advantages caused by the interpretation of quality and quantity in materials and workmanship.
2. Clerical errors in surveys and estimates.
3. Errors in plans and specifications.
4. Wasteful duplication in quantity surveying and estimating.
5. Inconveniences and delays after work is in progress, due to uncorrected errors and misunderstanding of plans and specifications.
6. Incompetence generally.
7. Unnecessary plans and wasteful stock specifications.
8. Incomplete plans and indefinite specifications.
9. Numerous unnecessary re-designs and abandoned projects.
10. Loss of time to the architect or engineer explaining doubtful items in plans and specifications.
11. Insufficient time allowed for estimating and then further extensions in time allowed after survey has already been rushed.
12. Removal of constructed work due to faulty plans and specifications.
13. Indistinct or unreadable workmanship on plans and specifications.
14. Wastes due to errors in surveys and estimates.
- (c) 1. Uncertainty of real costs until work is actually completed because the bids of others are withheld and outside surveys and estimates are not available.
2. Costs of projects in progress far in excess of original estimates because of no accurate precedent knowledge of what the real final cost should be, because of inability to prepare estimates, or because of loose systems and unnecessary waste.
3. The practice of issuing detail drawings after the award of work without any precedent information of their exact natures.
4. Failure to interpret plans and specifications.
5. Inaccurate lists of quantities and information which heretofore have been used, gathered from all sources, for competitive bids.
6. The purchase of unwarranted materials because of inaccurate survey.
7. Overlapping and duplication of subcontract specifications and prices.
8. The use of unscientific trade rules in measuring quantities and estimating.
9. Clauses of specifications shifting responsibility

- in structural methods and qualities of materials and workmanship.
10. Careless and loose systems used in quantity surveying, and guesswork in estimating.
 - (d) 1. Unreliable and unethical bonding.
 2. Bribes and graft.
 3. Bonding as an indication of fitness to execute work.
 - (e) 1. Contractors' and dealers' contingency funds for indefinite and unforeseen items.
 - (f) 1. Contractors' and dealers' excessive charges for extras due to the original low bid.
 2. Unnecessary and unreasonable demands and claims for extras by all parties to this contract which create overcharges.
 3. Profit consideration first—not pride of good work.
 - (g) 1. Furnishing bids so that the bid of the favored contractor may be checked up.
 2. Unreliable low bids.
 3. Unwarranted bankruptcies.
 4. Political considerations and influences entering into award of contracts for various reasons—picked interests, low first cost, graft, votes, impression of public, etc.
 5. Failures in business wrought by unsound or gambling practices.
 6. Favoritism.
 7. Law-suits.
 8. Bidding on the assumption that inferior materials and workmanship will be allowed.
 9. Inferior materials and workmanship to cover losses due to faulty estimating.
 10. Recall of plans and specifications for the purpose of manipulation, thereby rejecting bids after the figures of proposals are known to various sources.
 11. Sale of inferior materials and products not specified, at reduced cost, in order to gain business.
 12. Undesirable obligations.
 13. The unsound business practice of assuming indefinite obligations without definite plans, specifications and other positively known requirements.
 14. The inconsistent and psychologically bad practice of interested parties to the contract preparing the quantity survey.
 15. Unknown qualities and quantities demanded or executed at the expense of the contractor or the buyer.
 16. Unsatisfactory relationships between owner, contractor and architect or engineer.
 17. Overcrowding the industry with unreliable services in every branch.
 18. Cutthroat systems by which the constructor and owner lose alike, one in reputation and the other in service.
 19. Shopping of bids by general contractors and underbidding by subcontractors.
 20. Trickery in the opening of bids.
 21. Unreliability and irresponsibility generally.
 22. Clever architects, engineers, and buyers, who delight themselves at the expense of the bidder; whose estimates are considered very reasonable and oftentimes too much so.

Disastrous Results of Unreliability

Does surety bonding protect against any of the following disastrous results?

- (h) 1. Evil effects of structural or financial failures and degenerated practices upon the entire industry generally.
2. Bad effects of structural or financial failure of the constructor upon the architect or engineer.
3. Sad consequences of structural or financial failure upon the constructor.
4. Loss of life and money due to structural failure of materials and workmanship.
5. Delays, embarrassment, and financial loss to the owner caused by the structural or financial failure of the constructor.
6. Loss in reputation and business to the industry generally on account of structural and financial failures and degenerated practices before the public.

Is not the cost of these failures, to the in-

dustry and its clientele, greater with surety bonding than without?

Provisions Against Unreliability

Does surety bonding provide the owner, architect or engineer, builder and the industry in general with any of the following preventives against unreliability?

1. Positive accounting of work in progress and its cost.
2. A merit award of contracts.
3. Lowest bid consistent with specific instruments of purchase for any project.
4. Prompt bids.
5. Uniform basis for the measurement of cubage of structure.
6. Elimination of valueless competitions of all kinds.
7. A real competition of price and assurance of real value to the buyer and seller.
8. Reduction in construction costs from 1 to 20 per cent or more.
9. Improved labor conditions owing to stabilized business because of a more open dealing between the public and the industry.
10. Confidence in low bid.
11. Detailed uniform classification for an accurate distribution and analysis of cost records and cost control supervision.
12. Absolute check upon plans and specifications, contractor and subcontractors.
13. Greater number of reliable contractors and less of the other kind.
14. Cooperation and harmony between all parties.
15. Fair for unfair competition, or ethics for greed.
16. Uniform basis for competition in quantities and qualities of material and workmanship.
17. Greater public confidence in the entire construction industry.
18. Guaranteed fair costs to the buyer and increased profits in every branch.
19. More congenial and human working conditions for quantity surveyors and estimators.
20. Open and fair dealing in every branch of the industry, including the receiving of bids.
21. Recorded data for public or private valuation and advance information for tentative costs without new expense for survey and appraisals.
22. Increased efficiency in design, costs, and management, eliminating avoidable extras.
23. Fair remuneration for work without overcharged extras to insure ample profit.
24. Education of public to real values.
25. Correction and adjustment of errors in advance in plans, specifications and documents.
26. Efficiency for waste.
27. Reduce fluctuations in construction activities.
28. Elimination of contingency funds for unforeseen and indefinite items.
29. More uniform acquired labor unit factors.
30. Facilities for relieving the architect or engineers of much detail work involved in preparation and receiving of bids.
31. Elimination of unnecessary non-creative guarantees.
32. Honesty for dishonesty.
33. Uniform material indexes or keys showing materials in section and elevation of plans.
34. Detailed information not given on plans and specifications.
35. Detailed definite information for estimating, structural analysis, ordering materials, revisions of cost, auditing, progress reports, etc.
36. Better interpretations of plans and specifications by bidders.
37. Perpetual basic information for determination of fair costs in every branch of the industry.
38. Inspiration for better workmanship due to the elimination of risks.
39. Correct knowledge and fair representation of general conditions, temporary utilities, overhead and profit.
40. Uniform physical member classification.
41. Uniform measurement of material and labor quantities.
42. Permanent good business methods for unsound ones and gamble.

43. Decrease contractors' and dealers' estimating overhead, by at least 85 per cent.
44. Better opportunity for competent buyers and sellers.
45. Opportunity for changes in design and management of economic value.
46. Specific instruments of purchase.
47. Uniform and sound business practices in all branches of the industry.
48. Pride of good workmanship instead of out-rages—infated profits.
49. Higher standard of progress in every branch of the industry.
50. More uniform qualifications in bidders, basis of bidding, and judging bids.
51. Qualifications of merit for real fitness to execute work instead of bought influence.
52. Accurate quantities which make for economical yet safe bids.
53. An accurate quantity survey with the plans and specifications, which saves in the cost of construction.
54. Reduction in defective and wasted effort in plans, specifications, surveys, estimates, and construction.
55. Two-thirds reduction in the preparation of specifications.
56. One-third reduction in the preparation of plans.
57. Proper remuneration for skill, speed, and efficiency, including more work.
58. Definitely established responsibility for work executed by every branch of industry.
59. Absolutely full remuneration for all work done.
60. Recognition of quality materials and workmanship in every branch of the industry.
61. Positive remuneration for estimating other than the wastefully increased item included in overhead management costs—
—an indirect burden to the buyer.
62. Constructive solution for existing evil conditions.
63. Accurate survey records for preliminary figures or estimates.
64. Stabilization of costs and increased fair profits.
65. More time for supervision due to the decrease in time required for estimating by contractors.
66. Uniform structural type classification.
67. Sufficient time for the preparation of surveys and estimates.
68. Saving in construction time by elimination of errors and having complete schedules to start with at the beginning of work, by eliminating revisions of plans and specifications, estimating and in ordering of materials.
69. Award of work to the most competent in design, costs and management.
70. Elimination of waste generally, due to unreliability.
71. Non-partial witness to arbitration on the interpretation of plans and specifications.
72. More uniform acquired material unit constants.

What Real Service Is Performed by Surety Bonding?

Having thoroughly analyzed the statements of what surety bonding does not do, we will ask, "What, then, is the service performed by surety bonding?" Surety bonding is a non-creative service which assumes the burden of responsibility for our neglect to furnish complete and honest service to our clients. The rates charged for this service of guarantee, high as they may appear, are in fact very reasonable considering the great risks involved.

especially at a time of keen competition and high cost of production. These rates will, no doubt, be increased in proportion as the demand to supply such services increases and as laxity also creeps into this business.

Quantity Survey

Quantity survey is a creative service of first order and not a fiat or cure-all without effort. It is built upon basic principles, and when properly administered it will provide integrity by eliminating the causes, effects, and disastrous results from unreliability with a great direct and indirect saving in money, time, wasted effort, and worry of the client, buyer or owner and the industry in general. I am ready to explain or prove any statement made in favor of quantity surveys for the slight effort of a request, and in friendship challenge the opposing reactionaries to make

public a like list of benefits accruing from or in favor of the present gambling system of bidding due to unreliable and unethical practices. Again, some one will say, we have already tried quantity surveys without the least

Quantity Survey Defined

Quantity survey is the science of measurement and tabulation. When applied to the physical members of a structure, it is expressed in uniform units of measurement with an analysis and detailed accounting of its requisite material and labor applications.

benefit and probably more to detriment than anything else. For their information I say, the quantity survey has not been properly applied in connection with construction work and almost nowhere to building construction in this country today. I know nothing of its application in other countries. Our problems of its application are no doubt different, although the principal service is universally the same—work. I do know that quantity surveyors throughout this country are working very hard to introduce this very valuable service in every way possible, battling ignorance and stubbornness, all without the immediately desired improved results, simply because not one branch of the industry has the moral courage to cooperate for the benefit of the whole in supporting the quantity survey system of bidding. Yet quantity surveys are now available in every part of the United States.

Public estimating services and trade association quantity bureaus should not be confused with the professional quantity survey service or system of bidding. Public estimators and trade bureaus afford certain benefits—mostly economical—to contractors alone

under the existing conditions. Their work allows no time to improve methods nor to benefit the industry as a whole. Therefore, it is only a means of prolonging unsound business practices outside of the contractors' own organization. That such practices are in use for the ultimate breakdown of the present unethical system of bidding is greatly due to the lack of cooperation in the support of sound business practices by those who are in a position to promote scientific methods but fail to do so. This refers particularly to architects and engineers who should be acquainted with the most efficient and economical practices in order to render the highest degree of service to the client. As a result of this uncertainty and lack of proper application, every branch of the industry continues to reap the evil consequences of unreliability. Those who have bought quantity surveys in some form or another for curiosity are merely trying to use a first-class modern cylinder-lock key in an old-fashioned padlock. Failing to enter into its merits, they hasten to condemn the service as useless or worse without due thought of proper application. No structure can stand without proper foundation. This is also true of the quantity survey, which itself is the foundation of scientific bidding. The one and only proper application is to use it as the basis or foundation for competitive bids and the awarding of contracts. It will make wasteful guarantees unnecessary, because it is the most efficient insurance policy for the client against the waste of unreliability, and for the industry in general against disrepute and degeneration with their disastrous results.

Quantity survey is not an excess service improvised for the benefit of any single individual or group of individuals. It is absolutely necessary creative work done on every job, no matter how big or small. Whether this service is obtained by the contractor for the preparation of his individual estimate or secured from a professional quantity surveyor for a group of estimates, it matters not. All inefficiencies in methods and duplication of effort beyond securing a single accurate survey are an absolute waste and a burden to the entire industry and indirectly to its clientele. Quantity survey is not an experiment. It has always been in use by architects, engineers, contractors, in manufacturing, on farms, in stores and, in fact, by every one. It is the same principle the majority of us use even in the purchase of one pound of sugar or one

pair of shoes. We do not expect to receive two pounds of sugar for the price of one nor a pair of high-grade leather shoes for the price of one made of inferior leather without paying proportionately for quantity, quality, and the corresponding workmanship or service in price. Yet this is what the majority of people expect to receive in and from the construction industry. Today a great deal of trouble and expense is gone to in the preparing of elaborate, incomplete, and indefinite plans and unspecific specifications, stating some structural dimensions, some member sizes, some materials, some qualities required, and some indication of details but no quantities of anything and in a large percentage of cases nothing much of anything. If it is a question of trying to get a bargain, let me say, "There is no such animal." The more

If we have no faith in better methods or men, it is useless for us to expect them.

unreliable the buyer and seller, the more apparent is the willingness of each to transact business upon a loose basis. Some because they are ignorant of basic principles and others wilfully to avoid responsibility, effort, and expense without remuneration, prefer to let the other man do it and will not go to the trouble of acquainting the client with the real facts or else do not know them themselves.

Construction Economics

Economy must start with the client or purchaser, who eventually pays for all the unfair competition and inefficient production. He should certainly learn the cause responsible for waste. Do you wonder why construction costs are so high? The following tabulation shows what portion of the construction dollar is spent in absolute waste, even before any actual creative work is started:

(a) Valueless competitions (various kinds)	3 cents
(b) Defective and wasted effort on plans, specifications, surveys, estimates, and construction ..	5 cents
(c) Inefficiency or avoidable extras due to lack of knowledge in design, costs, and management	2½ cents
(d) Non-creative guarantees (not in insurance)	2 cents
(e) Contingency funds (for unforeseen and indefinite items)...	1 cent
(f) Overcharged extras (to insure ample profit)	½-cent
(g) Wastes due to all other effects of unreliability, exclusive of above items)	6 cents or more
	<hr/> 20 cents or more

These figures may look unbelievable at first glance, but they can be easily verified by taking the classified effects of unreliability and exposing them to your own experienced judgment. Then you will find the figures are rather conservative. The elimination of this great waste lies in the education of the client or buyer. Architects and engineers who are eager and willing to advance the construction industry to a higher plane of progress will do their share. Many are now suggesting quantity surveys only to have the client balk at the additional cost involved. The client pays many times over the cost of a quantity survey for items of absolute waste which are not brought to his attention and do not otherwise occur to him. When a client realizes the value of quantity surveys, then construction costs will drop and the industry will be benefited.

Efficient Management in Purchase, Production, and Sale

Architects and engineers should not furnish instruments of purchase without a definite and complete plan with specific instructions and a survey expressing full intentions of purchase, in structural dimensions, members in detail showing sizes, types, quality and quantity of materials, and also the quality of workmanship, and, above all, should not enter into petty schemes in order to win commissions for which there is always a price to be paid, unjust to some one.

Contractors should not enter into competi-

tion with others or individually submit bids where specific instruments of purchase are not assured or where the handling of the bid is not done in a fool-proof manner. Besides these, there are sufficient other ethical don'ts which are directly under the contractor's control to be taken care of.

The client, buyer, or owner should not request or accept any bids unless the treatment expected from the seller is the same that is provided by the buyer. How else may we expect fair dealing or satisfactory exchange? It should be seen to that the client or his representative provides instruments of purchase that warrant fair dealing. Whether these measures are adopted today or years hence, cannot eliminate the fact that they will have to be adopted if we really want to achieve the responsibility and progress that the industry is urgently in need of in its transactions. In every field of endeavor man seeks and uses the most efficient available means of economical production. Why not use the most efficient instruments, quantity surveys, in the awarding of our construction contracts? Architects, engineers, estimators, contractors, builders, subcontractors, bankers, appraisers, dealers, realtors, tax officials, manufacturers, etc., who quickly appreciate the possibilities and benefits of professional quantity surveys will reap soonest the rewards of this betterment. The purchaser will soon enough realize the economic benefits and the need of demanding quantity surveys as the most efficient basis for any purchase in order to revive sound business practices.

Sweet Service

WE are in receipt of the following yarn from Charles F. Ball, Chain Belt Company, Milwaukee, Wis., who claims that he has been cherishing it for ten years. He states that the Holt Manufacturing Company, of Stockton, Calif., now the Caterpillar Tractor Company, once sent a service man from their Spokane office to fix up a Caterpillar operating in Canada on which

the only report received was that the engine was "all stuck up." The service man came back with this solution: A 5-gallon can of cylinder oil had got mixed in transit with a 5-gallon can of maple syrup, and the engine undeniably was "all stuck up," with burned maple syrup. We wonder how the cylinder oil went with the pancakes in some genteel home or construction camp.

Geo. F. Smith Company Incorporates

THE Geo. F. Smith Company, Franklin and Channing Avenues, St. Louis, Mo., has recently incorporated. The capital stock is \$300,000 and is fully paid in. The officers of the new corporation are Geo. F. Smith, President; Edw. P. Rausch, Vice-President; Eldon M. Farnum, Vice-President; F. L. Smith, Secretary, and R. LeBrun, Treasurer. The new corporation suc-

ceeds the former Geo. F. Smith Company which has been operated by Geo. F. Smith as an individual since 1909. Mr. Rausch and Mr. Farnum have been with the Geo. F. Smith Company for thirteen years and eight years respectively, and their many friends will be glad to know that they are now officers of and stockholders in the new corporation.

Modern Warehouse Under Construction in Charleston, W. Va.

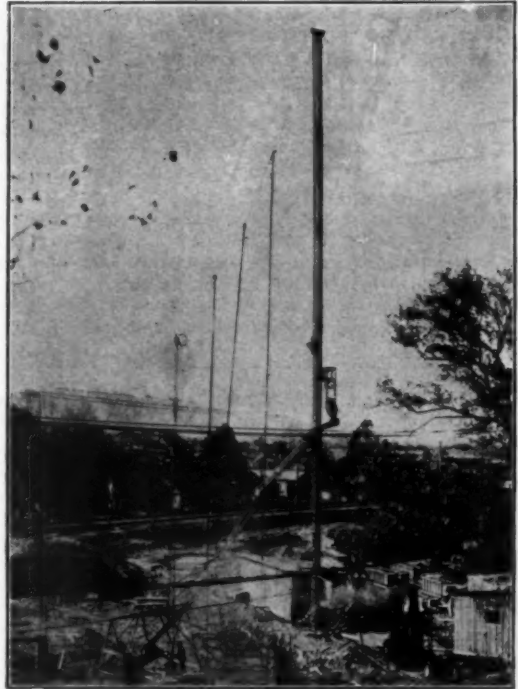
Rust Engineering Company, Pittsburgh, Building New Modern Plant for Valley Fruit Company

By W. L. Stanley

A THREE-STORY reinforced concrete and brick wholesale produce refrigerator and storage warehouse is being built by the Rust Engineering Company, Pittsburgh, Pa., at Charleston, W. Va., for the Valley Fruit Company, R. R. Delaney, President. The construction work is under the supervision of R. R. Cutler for the Rust Engineering Company, and Frank Coleman is job superintendent.

The building will be 180 feet long and 65 feet wide. It is being erected on one of the main streets of Charleston and will afford ample truck-loading space. It runs back to a siding which is cut in from the New York Central Railroad and over which the Chesapeake and Ohio Railroad transfers Charleston shipments from across the river. Also, the Baltimore and Ohio transfers a short distance for its shipments. This building is so situated that it has three railroads which cover the four points of direction in the southern part of West Virginia.

The accompanying illustration, which shows the pouring of the footings shows a 120-foot Insley steel hoist plant with 14-cubic-foot buckets and mast and Insley chute, as well as a 7-S Smith non-tilting drum mixer with a 2-cylinder LeRoi engine as the power unit. There is also a Nagle 40-horsepower boiler supplying steam to a large mixer. The lumber is sawed to sizes by a Beach No. 13 rolling-



POURING CONCRETE FOR THE NEW PRODUCE WAREHOUSE AT CHARLESTON, W. VA.

top table operated by a 2-cylinder LeRoi engine as the power unit.

San Francisco Accident Brings New Excavation Regulations

FOUR men lost their lives when the east wall of a building on Mission Street, San Francisco, collapsed, falling eastwardly into an excavated lot adjacent to the building. These men were employed installing foundation footing forms in the excavated lot.

From the report of the construction engineer of the California Industrial Accident Commission who investigated this accident, it was apparent that an attempt was made by the owner of the collapsed building in good faith and in

compliance with the city ordinance to obey the orders of the Industrial Accident Commission and the Building Ordinance of the city of San Francisco by underpinning the walls of his building. However, the construction engineer found that the method of underpinning some 15 feet of sand-bank with a 21-inch brick wall was poor engineering design. A standard practice is to design a retaining wall so that the width will be about 35 per cent of the height. In the present instance this ratio would call for a retaining wall about

5 feet in thickness, whereas the underpinning designed by the owner of the collapsed building was only 21 inches in thickness.

The only provision of the Building Ordinance of the city of San Francisco which was being administered at the time by the Building Inspector of the Department of Public Works and which might be construed as covering this hazard, reads as follows:

"A wall sustaining pressure of earth shall be designed in accordance with approved formula."

Order No. 1109 of the General Construction Safety Orders of the Industrial Accident Commission of the state of California, reads as follows:

"(a) All excavation shall be guarded by shoring and bracing or underpinning, or otherwise retained as may be necessary to prevent the sides from caving in."

After a careful study of the accident, together with a recent accident in San Francisco of a similar nature, and in view of the fact that the nature of the soil in some localities in the state of California makes for extremely hazardous excavation conditions, the Commission concluded that

neither its own safety orders, heretofore considered adequate by the Commission's engineers and other prominent authorities, nor the building ordinances of the city of San Francisco and other cities of the state, were sufficiently specific to assure a prevention of the recurrence of accidents of this kind.

The Commission therefore immediately proceeded to the extension of its general construction safety orders in such a manner as to set up more specific requirements covering excavation work of the character under discussion, having full confidence that the extended orders and their proper enforcement will save the lives of workmen and incidentally protect the property of its citizens. Committee hearings have been held in both Los Angeles and San Francisco, and the reports of the Committees will soon be submitted to public hearings. When the extended orders shall have been finally promulgated by the Commission, they will constitute standard requirements for the entire state and will also be under the provisions of Section 46 of the Workmen's Compensation Insurance and Safety Act, the minimum requirements for all municipalities making regulations upon the subject.

No Changes in Paving Brick Variety

Increase in Use of Thin Bricks Insures Early Recognition as Standard Variety

THE Standing Committee on Paving Brick Simplification, functioning with the U. S. Department of Commerce, held its annual meeting in Washington the first of April. As a result of its deliberations, no changes were made in the present list of four recognized varieties. The survey of shipments in 1925 shows that of a total shipment representing 96 per cent of the tonnage capacity of the industry, of 353,600,000 brick, 74.2 per cent were in the four recognized varieties. Percentages for the individual sizes in 1924 and 1925 are shown in the following table:

SHIPMENTS OF RECOGNIZED VARIETIES OF PAVING BRICK
IN PER CENT OF TOTAL SHIPMENTS

	Per Cent—	
	1924	1925
Plain wire-cut		
3 x 4 x 8½ inches.....	43.1	40.7
3½ x 4 x 8½ inches.....	11.0	5.5
Repressed lug		
3½ x 4 x 8½ inches.....	22.0	21.0
Wire-cut lug (Dunn)		
3½ x 4 x 8½ inches.....	6.0	7.0
Total	82.1	74.2

Increased Use of Thin Brick

The decline in the percentage of shipments of recognized varieties is due to the increased demand for thinner brick. The 2½ x 4 x 8½-inch plain wire-cut brick, which is not a recognized variety, showed percentages of shipments in 1923

of 2.7 per cent, in 1924 of 4.4 per cent, and in 1925 of 8.9 per cent.

Because of the evident tendency toward the use of thinner brick and because 2½-inch brick has so far stood up well in the brick road test now under way by the Bureau of Public Roads at the Arlington Experiment Station, the Committee gave careful consideration to the advisability of declaring the 2½-inch brick a recognized variety. The Committee rules, however, provide that unless there are special reasons, a variety shall not be designated as "recognized" unless its shipments for three successive years have amounted to 5 per cent of the total. Lacking a unanimous vote which the Committee's rules also require, the proposal to recognize the 2½-inch brick was lost. Because of the increased use of thinner brick, it is expected that the subject will come up again next year for discussion.

No Sizes Eliminated

The Committee's rules for eliminating a recognized variety require that the variety shall fall below 2½ per cent of shipments for three successive years. Since no variety came under this ruling and there were no special reasons for changes, no eliminations were made.

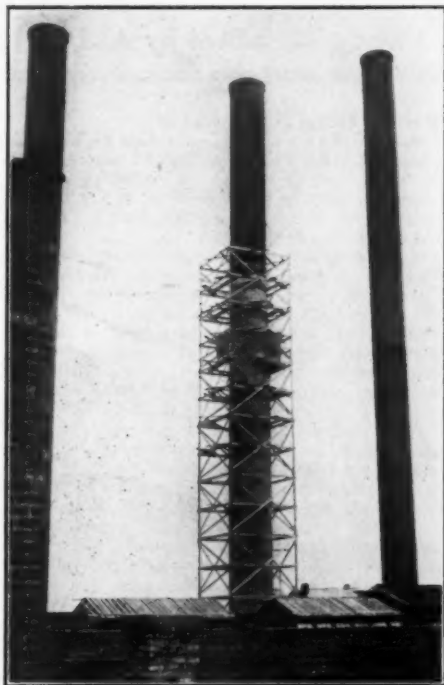
Unique Construction Saves Steel Stack

By George F. Paul

POWER station No. 1, of the Public Service Company, is located at Waukegan, Ill. The boilers are served by three self-supporting steel stacks 9 feet inside diameter, one being 200 feet high and two being 180 feet high. All the stacks rest on concrete foundations at the rear of the boilers. The central stack, 180 feet high, began to show signs of weakness from corrosion several years ago. Steel bands 5 feet apart were placed about it, about half-way between the roof and the top, and from these bands guy-wires were run to the two outside stacks and to the roof. The engineers decided that the stack was becoming dangerous and determined that serious attention must be given to the problem. To take the stack down and replace it would not only be expensive, but very undesirable from the operating standpoint, as it would necessitate shutting down one-third of the plant.

It was decided to conserve the stack by building around it a Guncrete stack, using the process originated and developed by the Cement Gun Construction Company, Chicago, Ill., which received the contract for the work. One of the stipulations was that there was to be no interruption whatever in the regular and continuous service of the stack during the progress of the work. A new reinforcing structure was designed, made of steel rods calculated to take all the stresses so that the new stack would not depend on the old stack for any of its support. This was anchored to the old foundation by means of the existing foundation bolts, which were extended by means of sleeve nuts and 1½-inch rods. Added to this structure was a wire mesh fabric designed to distribute the stresses more evenly and to carry the green Guncrete until it was set.

Immediately next to the stack and inside of the reinforcing structure a layer of asbestos board was wrapped around the hot steel stack. This acted as a compressible sheathing so that contraction and expansion stresses due



THE GUNCRETE STACK TWO-THIRDS COMPLETED
As the weather became colder and the wind grew higher, it was necessary to keep the structure encased in canvas most of the time. The guy-wires were left in place until the new structure had attained its strength

to the varying temperature of the steel stack might not be immediately communicated to the Guncrete stack, which would respond more slowly to the changes in temperature. Guncrete was then shot into place, the old stack being used as a form to shoot against. It was applied 8 inches thick at the bottom, tapering gradually to 4½ inches at the top. The concrete was a mixture of 3½ parts No. 2 torpedo sand and one part portland cement shot into place with cement guns at a pressure of 50 pounds per square inch, using a 14 x 12 single-stage air-compressor driven by a 60-horsepower motor.

WORKMEN DO NOT HAVE NINE LIVES

Only a cat, supposed to have nine lives, can afford to take a chance, insists W. H. Boyce of the National Safety Council. A good example is the best safety sermon, and a careful man is the best safety device.

Legal Points for Contractors

These brief abstracts of court decisions in the contracting fields may aid you in avoiding legal difficulties. Local ordinances or state laws may alter the conditions in your community. If in doubt, consult your own lawyer

Edited by A. L. H. Street Attorney-at-Law

Time for Filing Freight Claims

Standard forms of bills of lading provide that claims for loss or injury to freight must be made in writing to the initial or delivering carrier within six months after delivery, or, in case of non-delivery, within six months after lapse of a reasonable time for delivery.

Interpreting this provision in the recent case of *Davis vs. Oswald & Taube* (149 Northeastern Reporter, 861), the Ohio Supreme Court decided that a claim was filed by the consignor of a shipment in time when it was presented within six months after claimant acquired knowledge that delivery was not made to the consignee, although more than six months after arrival of the shipment.

The Court declared that a common carrier is bound to notify the shipper within a reasonable time of its failure to make delivery to the consignee; and that the railway company's delay in giving such notice in this case excused the shipper's delay in filing claim, in the absence of any proof that, through other information, the shipper knew or should have known that there had been non-delivery.

When a Wage Law Is Unconstitutional

The United States Supreme Court has declared to be void an Oklahoma statute, declaring that "not less than the current rate of per diem wages in the locality where the work is performed shall be paid to laborers, workmen, . . . or other persons . . . employed by or on behalf of the state, . . . and laborers, workmen, mechanics, or other persons employed by contractors or subcontractors in the execution of any contract or contracts with the state, . . . shall be deemed to be employed by or on behalf of the state." (*Connally vs. General Construction Company*, 46 Supreme Court Reporter, 126.) The Court said:

"We are of opinion that this provision presents a double uncertainty, fatal to its validity as a criminal statute. In the first place, the words 'current rate of wages' do not denote a specific or definite sum, but minimum, maximum, and intermediate amounts, indeterminately, varying from time to time and dependent upon the class and kind of work done, the efficiency of the workmen, etc.

"In the second place, additional obscurity is imparted to the statute by the use of the qualifying word 'locality.' Who can say, with any degree of accuracy, what areas constitute the locality where a given piece of work is being done?"

Contractor's Responsibility for Collapse Due to Defective Plan

Where a contractor for the construction of a bridge bound himself by an agreement to examine the site and the plans and specifications and to guarantee the work for four years against de-

fects of design, workmanship or materials, he could not avoid liability for collapse of the structure within that time on the ground that the design of the bridge was not suited to the location, held the Oklahoma Supreme Court in the late case of *Topeka Bridge & Iron Company vs. Board of County Commissioners of Major County*, 240 Pacific Reporter, 1043.

Interfering with Employment Relations

Workingmen have a legal right to strike in good faith as a means of inducing better terms of employment for themselves. But a strike merely to gratify malice or inflict injury is illegal. An employer of labor is entitled to enjoin individuals or a trades union from interfering with express contract rights of the employer under his hiring-agreements with his employees, as to employment contracted for an unexpired definite term. But where employees are hired for indefinite periods, they being free to quit any time, it is not actionable to induce them to quit. (*New York Supreme Court, Broome County; Vail-Ballou Press, Inc. vs. Casey*, 212 New York Supplement, 113.)

Fundamental Rules Governing Formation of Construction Contracts

The following summarized rules of law laid down by the North Carolina Supreme Court in the recent case of *Elliott Building Company vs. City of Greensboro*, 130 Southeastern Reporter, 200, apply to proposals to do work for private parties as well as to bids for public work:

Unqualified acceptance, within a reasonable time, of a definite offer to perform construction work constitutes a mutually binding contract.

Delay in the acceptance of a bid permits withdrawal of the proposal before acceptance; but a purported withdrawal of a bid after its acceptance is ineffectual.

The Court ruled against plaintiff's right to recover a deposit made under a bid which was found to have been accepted before attempt to withdraw it was made.

Subcontractor's Rights on Taking Over of Work

Craven was awarded a county road construction contract. The agreement required performance to the satisfaction of the County Engineer, whose decisions were to be conclusive. A subcontract was awarded to Davison, but the County Engineer declared that the work done under the subcontract was unsatisfactory, and ordered that Craven take charge of the work. Davison sued Craven for damages for loss or profits which would have accrued had he been permitted to execute the subcontract. Holding that the determination made by the County Engineer, in good faith, that the work was not being satisfactorily done was final, the Texas Commission of Appeals decided (276 Southwestern Reporter, 193) that the suit could not be maintained.

Many of our customers, visiting our plant, have told us that it doesn't look difficult to build Hercules Engines.

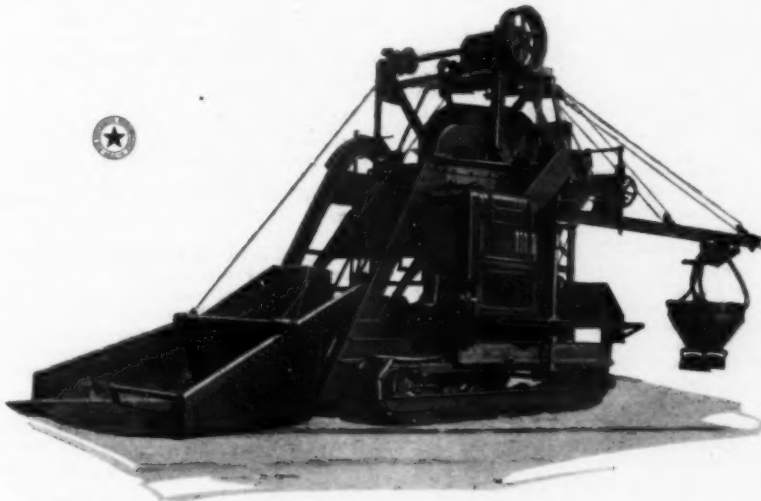
Our way it isn't.

Because our design is (1) correct
our design is (2) simple
our design is (3) economical

So that our manufacture is (1) correct
our manufacture is (2) simple
our manufacture is (3) economical

Therefore our engine is (1) correct
our engine is (2) simple
our engine is (3) economical

HERCULES MOTORS CORPORATION
CANTON, OHIO, U. S. A.



In the ramifications of the road-building, automotive, oil, contracting, quarrying and scores of kindred industries Hercules Engines and Power Units are proving worthy of their name by STAYING ON THE JOB.

HERCULES ON THE JOB ENGINES

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

When Public Policy Makes Public Contract Void

A paving contract let by a Texas city was held to have been invalid if awarded on an understanding that members of the City Council should make inspection trips to other cities, at the expense of the successful bidder. Reaching this conclusion in the case of *Meyers vs. Walker*, 276 Southwestern Reporter, 305, the Texas Court of Civil Appeals said:

"If a public official directly or indirectly has a pecuniary interest in a contract, no matter how honest he may be, and although he may not be influenced by the interest, such a contract so made is violative of the spirit and letter of our law, and is against public policy. . . .

"If it were to the interest of the city that this inspection be made, then the city should pay it and thus leave the officials without the least obligation and absolutely removed from any semblance of influence."

There was a sharp conflict in the evidence in this case as to whether or not there was an understanding that the successful bidder would pay the expenses of the trip.

It was decided that if such understanding existed, thereby invalidating the contract, the agreement could not be validated by newly elected officials taking the place of those in office when the contract was awarded. A void contract cannot be ratified.

Construction Company's Income Tax Returns

A corporation engaged in the business of road and street construction contracting, keeping its accounts on the basis of completed contracts and treating the total contract price as gross income in the year when the original construction work is finished, is not entitled to deduct therefrom a reserve for estimated expense of maintenance during the following years specified in the contract, in making its income tax returns. (*Appeal of Chapin Construction Company*, 3 United States Board of Tax Appeals Reports, 24.)

When Consignee of Materials Is Not Liable for Demurrage

Construction materials shipped to defendant contractors were delayed in unloading, and the delivering railway company sought to enforce a claim for demurrage. Finding that the delay was caused by a mob for whose actions defendants were in no way responsible, the West Virginia Supreme Court of Appeals decided that demurrage was not collectible. (*Chesapeake & Ohio Railway Company vs. Board*, 130 Southeastern Reporter, 524.) The Court took occasion to state the broad legal principle on which its decision rests, as follows:

"Demurrage charges are assessed by operation of law, and are not the result of a contract between carrier and consignee. It is a well-established principle of law that, while an 'act of God,' unavoidable accident, or the stress of circumstance, may not excuse the non-performance of an obligation created by contract, they will excuse the non-performance of a duty imposed by law. . . .

"The penalty for undue delay in unloading cars was imposed to promote the efficient service of railroads. It was designed to prod the slothful shipper and not to oppress one who is unable to perform by reason of a vis major" [superior force].

The Court cites a case where a consignee was held to be free from liability for demurrage on account of delay in unloading caused by a storm.

One-sided Contracts

One of the fundamental rules of law is that unless a contract binds both parties it binds neither; there must be mutuality of obligation. But a late decision of the Alabama Court of Appeals shows that the privileges of youth afford one of the exceptions to the rule. That Court holds (*Cleveland vs. Towle*, 106 Southern Reporter, 58) that the circumstance that a minor was legally free to have refused to enter upon employment contracted for, or to have terminated the employment any time, did not so far deprive the agreement of mutuality as to preclude the minor from recovering damages for the employer's refusal to permit commencement of work under the agreement.

The Court observed: "Contracts of infants for the performance of service are voidable merely at the election of the infant and not the other party."

When the Owner "Accepts" Work

Concerning legal proof of an owner's acceptance of work, the North Carolina Supreme Court lately said in the case of *Moss vs. Best Knitting Mills*, 130 Southeastern Reporter, 635:

"Acceptance . . . is a fact, with a mental act of intent to receive as one's own, or for the owner, as a compliance with the required duty of the . . . builder. . . . Acceptance may be expressed or implied from the conduct of the owner."

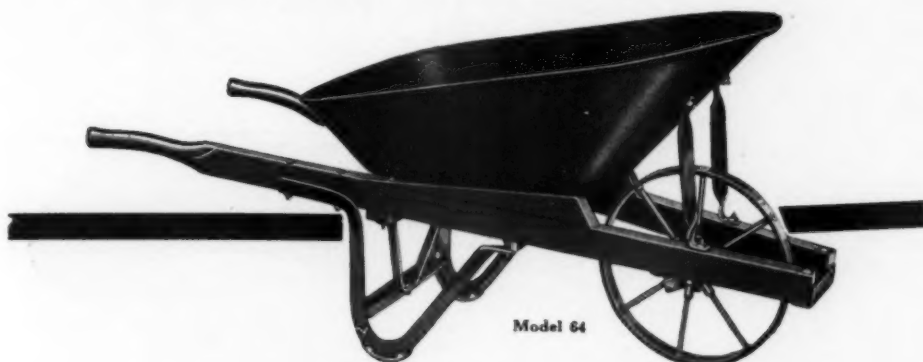
When Contractor Is Entitled to Recover as for "Substantial Performance"

One of the best-established and most important rules of law applicable to construction contracts is that the mere fact that the contractor has not strictly complied with the requirements of his contract will not preclude recovery of the contract price less the reasonable cost to the owner of having defects in performance of the contract remedied. But as declared the other day by the North Carolina Supreme Court in the case of *Moss vs. Best Knitting Mills*, 130 Southeastern Reporter, 635:

"This rule of 'substantial compliance' is only applied when a builder has undesignedly violated the strict terms of his contract, and the owner has received and retained the benefit of the builder's labor and material, and the builder is ready to remedy. The defects must be trivial and slight. . . . The owner is entitled to damages by reason of the failure to perform strictly. . . . His damages is the cost of material and labor . . . in putting the structure in condition called for by the contract."

Waiver of Contract Clauses Concerning Payment

Where payments were made to an excavation contractor without compliance with a clause of his contract calling for estimates as a basis for payments, and refusal to make a subsequent payment was based on another ground, the general contractor could not defend such refusal on account of the excavation contractor's failure to produce an estimate. (*Michigan Supreme Court, People vs. Fidelity & Deposit Company of Maryland*, 205 Northwestern Reporter, 157.)



Model 64

The Man at the Handles Works Faster and Better

Here is the mortar and concrete barrow that delivers two loads while a less specialized barrow is getting there with one.

The hang and balance of this Bull Frog No. 64, the shaped handles, the risers that carry the load well forward over the wheel, the smooth-running "Never-Break" wheel make it easy to handle. The deep seamless tray that clears easily and perfectly, the rounded nose that makes for quick, accurate dumping into forms, the angle iron nose guard that meets every operating shock with rigid strength—these are features that enable the Bull Frog No. 64 to render a long life of service under extreme conditions of use, and also to deliver more work per hour of labor cost.

See your jobber about it or write us. We will gladly send our catalog to any contractor. It describes Bull Frog barrows, carts, scrapers for all factory, mill, mine, concrete, mortar, contracting, and industrial need.

**Built
for
Work**

THE TOLEDO WHEELBARROW CO.
Toledo, Ohio

Branch Offices and Warehouses

PHILADELPHIA
233 NORTH 12th ST.

CHICAGO
337 RIVER STREET

BULL FROG
WHEELBARROWS



When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

A 4-Cylinder, 10-Ton Road Roller

Sturdy Gasoline-powered Unit Built for One-Man Operation

A WELL-BUILT 4-cylinder, 10-ton road roller, equipped with a 55-horsepower Climax motor, has been announced by the Galion Iron Works & Manufacturing Company, Galion, Ohio. The application of the power from the engine is by an efficient balanced transmission system, Twin-Disc clutches, and spur gear differential. The machine has two speeds forward and reverse, with a speed range of $1\frac{1}{2}$ to $3\frac{1}{2}$ miles per hour. By the use of lock-pins the entire power of the motor can be applied to either drive wheel or to both equally, cutting out the differential entirely.

The foot brake, which can be locked, gives absolute control of the steepest grades, and an emergency hand brake with equal power is an extra element of safety.

The frame of this Galion Master roller is half-inch steel plates tied together and braced by heavy crossbars. The motor and transmission, bolted to angle-iron supports riveted to the frame, form an additional brace. The rear of the frame is further braced and tied together by the heavy steel platform tank and breastplate, and the front is riveted to a heavy steel casting which forms the housing for the front roll mounting.

The front rolls consist of two cast iron segments running on the same axle, but moving independently in turning. They are 44 inches in diameter and together have a width of 44 inches. The rear rolls are 72 inches in diameter with a



THE GALION 10-TON, 4-CYLINDER MASTER ROLLER

standard 20-inch width of space, but may be furnished in 22- or 24-inch widths, if desired. Scrapers are provided on both the front and the rear of the rolls. The steering device is a worm and segment device which gives direct control, and the platform is high enough so that the operator has a full view of the road and of all the work. The gasoline tank, directly in front of the operator's platform, holds 30 gallons, or enough for 25 hours' rolling operations.

The scarifier is a strong, practical, solid unit. The reversible teeth are 30 inches long and 2 inches square. The scarifier teeth stand at a 45-degree angle at all times, whether up or down. Pneumatic pressure for the application of the teeth is supplied by a gear-driven compressor with no belts to slip. The powerful scarifier will tear up a strip of paving 6 feet wide.

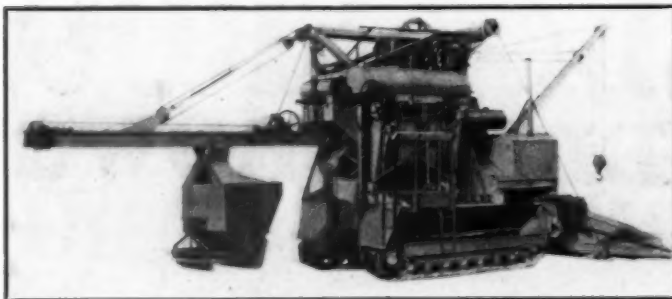
A 7-Second Water System for Pavers

Manufacturer Eliminates Water Delays and Penalties

A NEW 7-second water discharge, which definitely eliminates the penalties in mixing time and mixing delays, is now being featured on the Rex 27-E paver, manufactured by the Chain Belt Company, Milwaukee, Wis. It is obvious that a slow water discharge taking 15 or more seconds cannot always get the water into the drum fast enough for it to be thoroughly mixed with the aggregate. Thus, 5 to 15 seconds has to be added to the specified mixing period. In checking the new Rex system, a stop watch showed that the tank discharges completely in from 6 to 7 seconds, which is bound to increase the yardage

output of the mixer.

The pressure is made high and the pipe connection short, so that the tank refills quickly. Furthermore, discharge is speedy from full tank to empty, instead of starting out quickly and slowing up at the half-way point as with some discharges. The Rex siphon is so constructed that it does not suck air until the tank is virtually empty. As a result, there is a full-volume flow of water from start to finish. In addition, the pipe line to the drum is constructed without elbows and without inside obstructions, greatly aiding free flow.



THE NEW
REX 27-E PAVES
WITH FAST WATER
DISCHARGE



Byers Bear Cat owned by Spencer, White & Prentis, New York, driving piles for foundation.

**"I bought two machines a year apart,
which is the best recommendation"**

(Signed) E. A. Prentis, Jr., SPENCER, WHITE & PRENTIS

The Byers Machine Co., Ravenna, Ohio
SALES AND SERVICE THROUGHOUT THE COUNTRY
THE ALL-PURPOSE ONE MAN CRANE

Patents Pending



BYERS BEAR CAT

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.



BAY CITY 16-B EXCAVATOR WITH NEW CRAWLER TRACTION

Excavator Now Equipped with Full Crawlers

Other Improvements in Convertible Excavating Unit

FULL crawler-traction is now available for the Bay City 16-B excavator, according to a recent announcement of the Bay City Dredge Works, Bay City, Mich. The crawlers have a tread 16 inches wide, 14 feet 6 inches long, and 30 inches high. The sizes of the clutches and bands are slightly increased, and the skimmer-

ditcher trip rope is now located so that the operator can reach and operate it, doing away with the ground man.

The manufacturers claim that this new equipment gives increased propelling speed, increased mobility, better traction, and positive steering. Power is applied to both treads on turns.

A Compact, All-Steel, One-Man Puller

Handy Unit Capable of Many Applications on Contracting Jobs

ON most contracting jobs occasions arise when something must be pulled, moved, or lifted. Such tasks necessitate the use of several men and much time unless some type of dependable pulling machine is quickly available. The

John Waldron Corporation, New Brunswick, N. J., has developed the Handy Andy Junior puller for just such work as this.

Without blocks, this puller on a straight line will pull 10 tons, with one block it will pull 20 tons, and with two blocks 40 tons. It is made to pull up to the capacity of a 1-inch cable. The drum holds 60 feet of $\frac{5}{8}$ -inch cable. This puller has two speeds, a high speed for making long, light pulls faster, and a low speed for use on heavy pulls. It is equipped with a 5-foot steel operation bar which moves back and forth, like the operation of rowing a boat.

The Handy Andy Junior consists simply of a steel winch with ratchet, both strongly constructed with nothing to get out of order, and having a total weight of less than 285 pounds, including the 5-foot lever, 60 feet of $\frac{5}{8}$ -inch steel cable drum line with hook at one end and ferrule on the other, and 15 feet of $\frac{7}{8}$ -inch cast steel cable for an anchor line, fitted with a hook on one end and an eye on the other.



SPOTTING A FREIGHT CAR WITH HANDY ANDY



3000 cu. yds in 154 hours
with a 14-S Mixer

Ransome
of course!

It nearly took a motion picture camera to keep up with this job of the Southwestern Engineering Co. for the 500,000 Bushel Burrus Elevator at Dallas.

Like many another contractor, the Southwestern people put their faith in a Ransome 14-S equipped with Power Loader—and here's the result.

A mighty good job without an hour's delay on account of mixer trouble. But, then, they had a mighty good mixer to start with.

RANSOME CONCRETE MACHINERY CO.
Dunellen - - - New Jersey

Ransome Standard Building Mixers

9192

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

A Steel Mast Hoist Plant

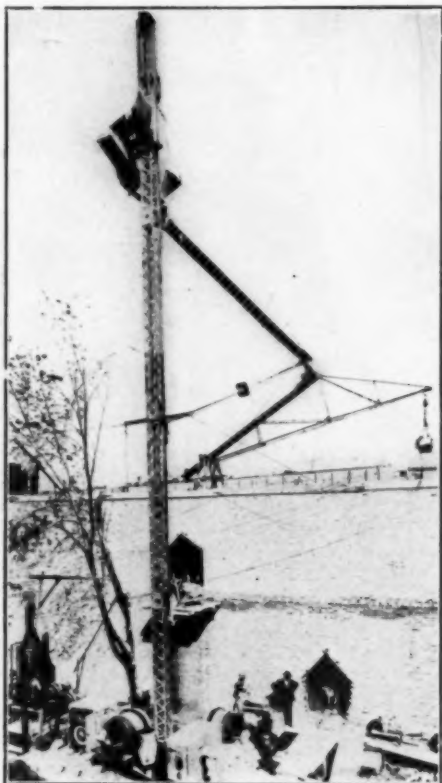
Can Supplant Steel Tower on Many Concrete Jobs

A NEW mast hoist plant for use in placing concrete, which incorporates most of the advantages hitherto possessed only by steel tower plants, has been developed by the Insley Manufacturing Company, Indianapolis, Ind. This mast hoist is so built that a 40-foot boom and a 40-foot counterweight chute can be used, also a bucket having a capacity of 24 cubic feet water-level capacity for use with a 21-S mixer. This makes a chuting plant which can be used on the type of work which is not of sufficient size to warrant the installation of a steel tower.

The mast hoist is made with two bucket sizes, that mentioned above, and a 17-cubic-foot bucket for use with a 14-S mixer. Each bucket is of the same design, being of the tip-over type, so balanced that the center of gravity is back of the hinge or tipping point, so that a positive downward pull is required on the front of the bucket to tip it. This force is furnished by the engagement during hoisting of a set of rollers, located on the right front corner of the bucket, in a switch located on the hopper connecting chute. A feature of this dumping arrangement is that the rollers can pass through the switch in the event that the engineer does not stop his hoist at an exact spot. Thus unlimited overrun of the bucket is provided, without danger of any damage to the rest of the plant. As the bucket is lowered, the rollers pass back through the switch, thus righting the bucket. The tip-over type of bucket is especially useful in handling stiff concrete, the use of which is increasing daily.

Steel masts are made in two sizes: the heavy mast for use with the 21-cubic-foot bucket, 40-foot boom and counterweight, or both; and the lighter or standard mast for use with the 14-cubic-foot buckets, and simpler arrangements of chutes. Masts are made in 20-foot interchangeable sections. The heavy mast can be erected to a height of 200 feet in the clear, and the standard mast to a height of 140 feet in the clear. Both masts can be set up to greater heights if they are tied to the building.

Hoppers are furnished with all types of mast hoist plants for storage of the concrete. The connecting chute which carries the dumping switch is attached to the hopper. Thus the point of dump of the bucket is automatically regulated. The hopper, first section of chute, and the boom, if used, are mounted on a sliding frame, so that the entire assembly can be moved up or down the



THE NEW INSLEY STEEL MAST PLANT WITH COUNTERBALANCED CHUTE IN SERVICE

face of the mast as a unit.

A large material elevator is used with the mast hoist to hoist bricks, mortar, and other materials. It operates on the front face of the mast at the same time that the concrete bucket is hoisted on the rear face, and eliminates the need of a wooden elevator cage, commonly used on construction jobs.

Various combinations of mast hoist equipment are available, from the most complete boom and counterweight chuting plant to the simplest hoisting plant for placing concrete with buggies, any of which are more efficient and economical than a wood tower plant for the same class of work.

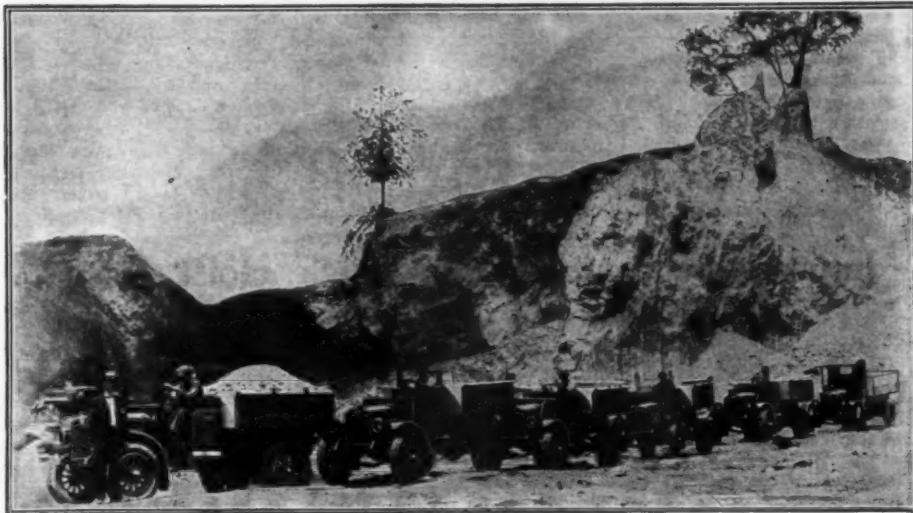
Steel Curb and Gutter Forms in Florida

The Foundation Company Building Extensive Sidewalk, Curb, and Gutter Mileage

THE Foundation Company, 120 Liberty Street, New York, recently ordered a carload of Heltzel steel curb and gutter and sidewalk forms for their work on the D. P. Davis properties, St. Augustine, Fla. The total award

of the job is in excess of \$8,000,000 and covers a contract for the building and physical development of Davis Shores.

The Foundation Company will pave the streets, lay the sidewalks, and build curbing, using steel



Fleet of Ruggles Road Builders owned by Tri-State Transportation Co., Asheville, N. C.

Ruggedness—Speed—Long Life

These three essentials built into every RUGGLES Road Builder mean low operating and maintenance costs, more trips per day and a large saving in renewal of equipment. You will find the initial cost is surprisingly low.

RUGGLES Road Builders are built in the following sizes:

Model 22G—Gravel capacity 36 cubic feet

Model 41D—Gravel capacity 45 cubic feet

Model 40HRB—Gravel capacity 66 cubic feet

Write us for detailed information.

Ruggles Motor Truck Company
Saginaw, Michigan, U. S. A.

RUGGLES

IT'S A GOOD JOB

When writing to advertisers, please mention the Contractors' & Engineers' Monthly--Thank you.

forms made by the Heltzel Steel Form & Iron Company, Warren, Ohio, for this work. They will install water and gas mains, all sewage disposal drains, erect lighting fixtures, and put all power, light and telephone wires in conduits, making them available for each lot owner at Davis Shores. There will be 44 miles of streets paved and 87.7 miles of sidewalks with the same amount of curbing. The streets will be 100, 80 and 60 feet in width, depending upon the amount of

traffic they will be expected to carry and their relative locations.

Other Florida developments on which Heltzel steel forms are being used are the new city of Indrio just above Fort Pierce, Coral Gables, Seminole Estates, Pablo Beach, Venice, Jensen, and practically all of the subdivisions in and around Jacksonville, St. Petersburg, Tampa, and Winter Haven, as well as at Clearwater, Lake Worth, Palm Beach, and West Palm Beach.

Improvements in Dump-Truck Hoist Design

Oil Tank Eliminated and Reservoir and Oil-Ways Cast in Cylinders

CHANGES in the design of its motor-truck dump-body hoist, making possible higher dumping angles, a reduction in weight, and the elimination of oil troubles, have been announced by the Heil Company, Milwaukee, Wis. The illustration shows a Model 4S-26 hoist mounted on a 3-ton truck. Power is applied direct and the hoist swings on its saddles.

The gear pump in the manifold develops the pressure and forces the oil down the oil-ways on the front of the cylinder and under the piston-

heads. The pressure raises the load. As the piston-rods move out of the cylinders, a supply of oil from the oil reservoir is required to take their place. This oil reservoir is now cast integral with the hoist cylinder, replacing the sheet-metal tank and connections. This construction prevents all possibility of oil-tank leaks. The elimination of the sheet-metal tank gives the unit a more finished and clean-cut appearance and permits the servicing of any part of the hoist without the necessity of removing any other part not requiring service.

The head of oil in the reservoir is now below the piston-rod gland nut instead of above, preventing oil leaks around the piston-head. This, with the elimination of the oil tank, keeps the hoist clean and free from oil accumulations. There is positive equalization of oil between cylinder reservoirs through an equalizer tube, eliminating the possibility of drawing air into the cylinders. The oil is now drawn into the pump through the opening in the rear of the cylinder, then through an oil passage around the inner side of the cylinder. Because the oil opening is at the rear of the cylinder, the tilting of the hoist in raising assures a positive flow of oil to the pump at all times, thus eliminating the churning of oil. The distance between the piston-head and the cylinder head when the hoist is in extreme raised position has been more than doubled, giving a better support and greater rigidity to the piston-rod.

The oil capacity of the new hoist is 15 quarts, whereas the oil capacity of the old hoist of the same type was 20 quarts. The weight of the hoist filled with oil has been reduced from 20 to 40 pounds, an important item for users in certain states. The piston stroke has been increased 2 inches, increasing the dumping angle approximately 5 degrees as well as increasing the ground clearance.



A HEIL HYDRO-HOIST MOUNTED ON A 3-TON DUMP-TRUCK

GASOLINE CRANES WITH $\frac{3}{4}$ - AND 1-YARD CLAMSHELLS ARE POPULAR

There is an apparent tendency among contractors to standardize on gasoline cranes with clam-shell buckets having load capacities of $\frac{3}{4}$ yard and 1 yard. This equipment is plainly the choice of a majority.

The relative merits of unloading equipment are controlled by: the physical conditions surrounding the plant site; the equipment already owned by the contractor; the human element which enters into the operation of the equipment; the character built into the equipment itself by the manufacturer; and, last of all, but not least, the initiative the contractor possesses and expresses in the use of his equipment.—Robert Petersen, Henry W. Horst Co., Rock Island, Ill.



Tarvia
For Road Construction
Repair and Maintenance

Highway experience at your service—

SINCE the first Tarvia road was built, highway engineers and Tarvia men have worked together.

Each Tarvia field man has at his disposal a vast fund of road-building knowledge accumulated from reports and records from all parts of the country. He will gladly extend to you the opportunity to benefit from this accumulation of sound, practical experience.

Get acquainted with the Tarvia field man in your district. Let him help you with your paving problems.

The *Barrett* Company

New York	Chicago	Philadelphia	Boston
St. Louis	Cleveland	Cincinnati	Pittsburgh
Detroit	Kansas City	Birmingham	Dallas
Minneapolis	Salt Lake City	Bethlehem	Lebanon
Youngstown	Milwaukee	Toledo	Columbus
Baltimore	Syracuse	New Orleans	Rochester
Providence			Buffalo

In Canada: —

THE BARRETT COMPANY, Limited
Montreal Toronto Winnipeg Vancouver

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

An Improved Line of Motor Trucks

New Models Incorporate Changes in Design and Construction

A COMPLETE new line of improved motor trucks embodying changes in design and construction, with complete standardization from the 1¼-ton rapid-transit truck to the 5-ton Model-35, has been announced by the Republic Motor Truck Company, Inc., Alma, Mich. The line now consists of trucks of 1¼, 1½, 2, 3, 4½ and 5 tons capacities, and a 16-20 passenger bus.

The Model 15, a new 2-ton truck, has a heavier and deeper frame than the old model 11-X which it replaces, has 34 x 4-inch front tires and 34 x 7-inch rear tires of the solid pressed-on type. The springs are heavier, longer, and wider, the front springs being 2½ inches wide and 39 inches long, while the rear springs are 3 inches wide and 54 inches long. There is a tie-bar between the rear spring brackets which has its own points of application and does not replace the shackle-bolts. This construction allows the standard high-carbon heat-treated bolts to be used for the shackle action.

The service brake is mounted on the front propeller shaft at the center bearing support, and consists of a single laminated drum with two

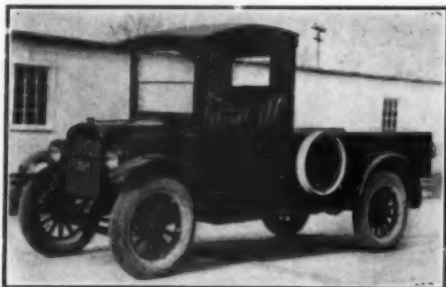


A REPUBLIC MODEL-35 TRUCK EQUIPPED WITH DUMP BODY, UNDERBODY HOIST AND CLOSED CAB

wide shoes mounted on a tubular member especially designed for frequent application without excessive wear or overheating. The wheelbase is 154 inches, with 173 inches available. The gasoline tank has a capacity of 20½ gallons. The Waukesha motor with Ricardo head, 4-inch bore, and 5-inch stroke is standard equipment, although the Continental motor with 3¼-inch bore and 5-inch stroke is optional. The cab is designed throughout for clear vision and comfort.

The improved Model-30 of 4½ tons capacity replaces the former Model-20. The frame is 9 inches deep and 9/32-inch thick, and has a 3½-inch flange, affording a foundation of great strength. The front tires are 36 x 5-inch and the rear tires 36 x 12-inch. The front springs of chrome vanadium steel are 3 inches wide and 44 inches long, while the rear springs are 4 inches wide and 52½ inches long.

The Model-35 5-ton truck has a new and larger radiator with a 9-inch frame of pressed steel channel section and 36 x 6-inch front tires and 36 x 14-inch rear tires. The drive-shaft brake with two laminated drums provides a safety factor very acceptable in a truck of this size.



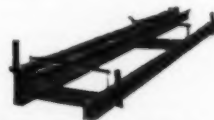
REPUBLIC RAPID TRANSIT 1¼-TON TRUCK EQUIPPED WITH EXPRESS BODY AND FOLD DOOR CAB

A Face Rail Clamp for Curb and Gutter Forms

Device Prevents Creeping and Spreading

A NEW face rail clamp has recently been developed for use with curb and gutter forms, by the Heltzel Steel Form & Iron Company, Warren, Ohio. This clamp, or overhead hanger, as it is sometimes called, is made with hook bolts on both ends which hook down onto the top flanges of the front and back rails. A long wing connected with the face rail clamp extends through a slot in the top of the face rail, extending down its entire length, preventing the face rail from spreading. Near the top of this wing is a small piece of angle-iron which rests on top of the face rail, preventing it from creeping up, and also giving clearance under the face rail clamp for the use of finishing tools.

THE HELTZEL RAIL CLAMP



The division plate is made with long wings on both ends which hook up through slots in the front and back rails, preventing them from spreading.

Makers of Oiljaks Move

THE Oil Jack Company, Inc., has announced the removal of its offices from 1457 Broadway, New York, to 110 West 40th Street, New York.



from
**"Cement, Mill
 & Quarry"**
 December 5, 1925

Anton Miench is a dealer in building materials at Iron Mountain, Mich. Recently he decided to extend his activities by putting in his own plant for the production of sand and gravel, and as a result has now in operation a compact and efficient small plant capable of turning out up to 250 yds. per 10-hour day.

The plant is located at Twin Falls, about 4 miles from Iron Mountain, and is producing five grades of material: plastering sand, brick sand, $\frac{3}{4}$ in. and under, and $\frac{1}{2}$ in. and over. A loader is also installed so that pit-run material can be loaded if there is demand for it.

The plant was designed for Mr. Miench by the Smith Engineering Works of Milwaukee. It in-

Mr. Miench left it to Telsmith

Telsmith engineers not only designed his plant, but built the machinery—from crusher to bin gates—and guaranteed it to suit his individual requirements. Expert service and centralized responsibility are the factors that characterize Telsmith Balanced Service.

Mr. Miench's equipment was arranged to suit his conditions. The gravel is dumped into a concrete hopper, equipped with a 16 in. by 5 ft. Telsmith Plate Feeder which regulates the flow of aggregate to the belt conveyor. The 18 in. Telsmith Belt Conveyor discharges to a 24 in. Telsmith Rotary Grizzly, which takes out the finer material so that only the coarse rock goes into the crusher, a No. 6A Telsmith

Primary Breaker. Both crusher product and natural gravel pass into a No. 5 Telsmith Belt Bucket Elevator, which feeds into a 32 in. x 14 ft. Telsmith Washing Screen. This device not only scrubs but also sizes the material. The sand then goes to two Telsmith Sand Tanks, which grade it into plaster and torpedo sand.

When you want a gravel plant—leave it to Telsmith. Get a tailor-made plant to fit your needs—designed, built and guaranteed entirely by Telsmith, a concern of pioneer experience and ample financial responsibility. Telsmith means results—results mean profits for you. Glad to mail you Bulletin G. P. 21.

SMITH ENGINEERING WORKS, 1820 Holton St., Milwaukee, Wis.

Canadian Representative, Canadian Ingersoll-Rand Co., Montreal, P. Q.

18 East 41st St.
 New York City

Beckwith Mch. Co.
 Pittsburgh and Cleveland

Borchert-Ingersoll, Inc.

G. P. No. 2. St. Paul, Minn.

Old Colony Bldg.
 Chicago, Ill.

Seibert-Milburn Co.
 Columbus, Ohio

Geo. F. Smith Co.
 St. Louis, Mo.

Waldo Bros. & Bond Co.
 Boston, Mass.

Knox Eq. & Eng. Co.
 Indianapolis, Ind.

Bunting Hdw. & Mch. Co.
 Kansas City, Mo.

TELSMITH

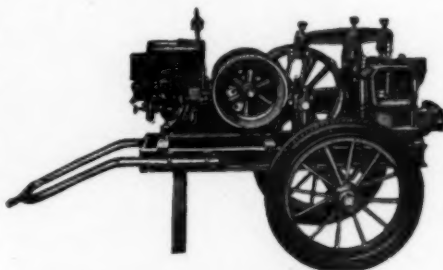
When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Trailer Diaphragm Pumps

Units with Two Rubber-tired Wheels, Particularly Adaptable for Dewatering Excavations and for Emergency Work

A HIGH-CAPACITY diaphragm pump mounted on two-wheeled rubber-tired trailers has been developed by the Humphries Manufacturing Company, Mansfield, Ohio. These pumping units are especially useful for pumping out manholes and excavations, and are favored by contractors because of their easy portability and the speed at which they can be taken from job to job. The units are equipped with either single 3- or 4-inch pumps, mounted on hot-riveted structural steel frames with two steel wheels equipped with rubber cushion tires. The outfit is evenly balanced and can easily be handled by one man. A convenient hitch is provided at the end of the tongue for attaching to an automobile or truck. There is ample clearance under the support when the unit is being trailed.

The pump unit is readily accessible, and the discharge valve can be easily removed for cleaning purposes in a very short time with an ordinary wrench. The surfaces of the spout casting and the base which hold the diaphragm are ground. Two brass springs on the guide rod of the discharge valve insure positive action in closing the



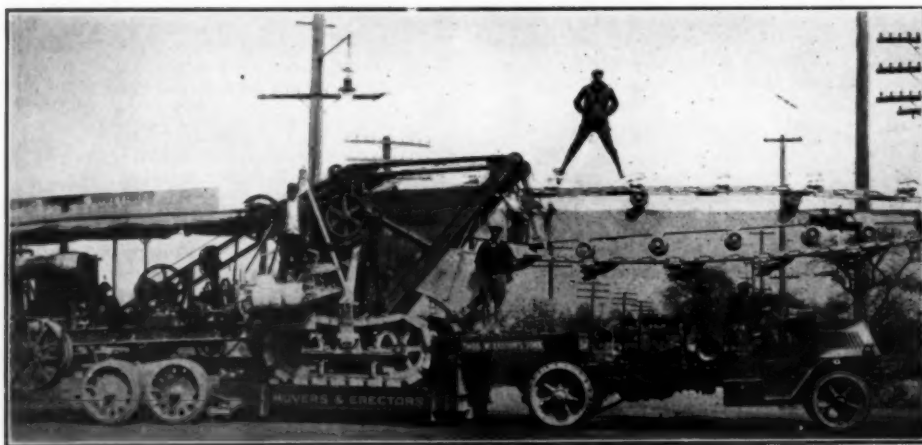
A HUMPHRIES TRAILER DIAPHRAGM PUMP

valve at the start of the upward stroke, resulting in utilizing the full upward stroke in sucking water. The suction valve is simple and substantial, being made of high-grade rubber and fabric, vulcanized together, as in the diaphragm, to insure durability.

The trailer units are also made for use with the Humphries lift and force trench pump.

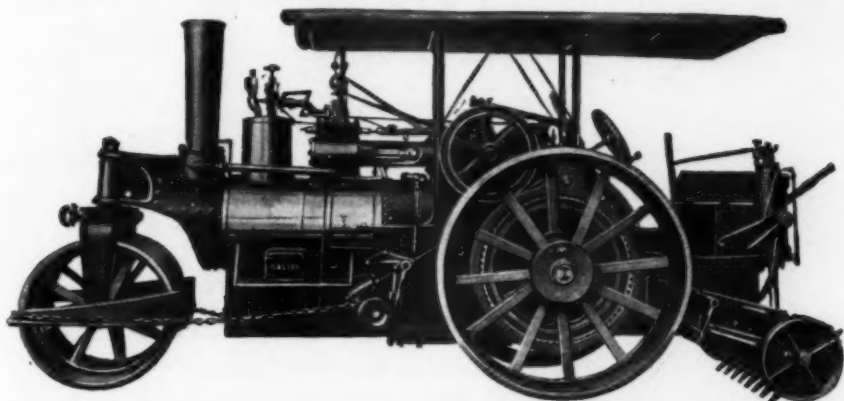
Moving a Giant Ditcher

Even the Big Fellows Have to Move Rapidly Sometimes



LARGE TRAILER MOVES HUGE TRACTION DITCHER AT FAST PACE

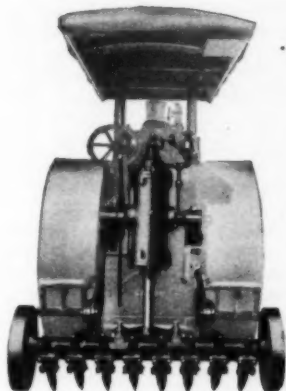
The Model AE-70 35-ton Warner heavy-duty drop-frame trailer shown in the illustration was recently sold by the Day & Maddock Company, Cleveland, Ohio, to Thomas W. Easton Sons Company, also of Cleveland. It is shown moving a Buckeye trench excavator with comparative ease from one locality to another in quick time. The trailer is equipped with hydraulic brakes and springs and the front of it is supported on a tractor truck, but the bulk of the load is carried by the four rear wheels placed on two separate axles. The loading platform is 21 feet long and 9 feet 6 inches wide. It can be used either as a side loader or a rear loader. The loading platform is 27 inches from the ground, which is very low and makes it convenient to load extra-heavy machinery. The Buckeye excavator, which makes a good-sized load for this trailer, weighs approximately 45 tons.



FOR STEADY SERVICE AND SATISFACTION

GALION

STEAM ROLLER AND SCARIFIER



Galion Steam Roller efficiency has been proven on hundreds of miles of roads. This roller offers you strength, power, service, durability, economy unequalled in the steam roller field. You can secure immediate delivery of your Galion Steam Roller if you place your order soon. Write or wire us at once for facts and prices.

The Galion Steam pressure Scarifier used with this roller is extra heavy and strong with teeth two inches square and thirty inches long. It is a scarifier without an equal.

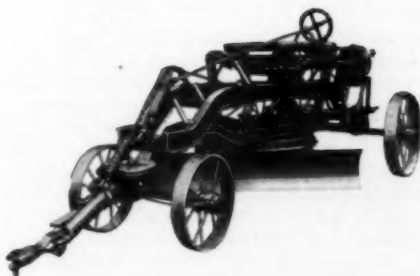
Other Galion Products

In addition to Steam Rollers, the Galion line includes two-cylinder Motor Rollers, the Ten-Ton, Four-Cylinder, Master Motor Roller, Fordson-powered Rollers in weights from 3 to 10 tons. Four-Cylinder Tandem Rollers in 5-, 6-, 7- and 8-ton weights, and Steam Tandems. The line also includes Motor Graders, and a complete line of horse and engine graders and maintainers, Fresno, Slip and Wheel Scrapers, Unloading Equipment, Gravel Screening Plants and other equipment.

Write for prices and information on the equipment you need.

The Galion Iron Works & Mfg. Co.
Galion, Ohio

Branches and Representatives in all parts of the Country.



GALION 88 E-Z LIFT GRADER



THE
STOCKLAND
PATROLMOBILE,
SHOWING POSITION
OF DRIVER RELATIVE
TO TRACTOR,
SCARIFIER, AND
GRADER BLADE

A New One-Man Patrol Grader

Outfit Pulls Grader Blade Instead of Pushing It

A ONE-MAN power patrol grader with detachable power units for general road maintenance purposes has been announced by the Stockland Road Machinery Company, Minneapolis, Minn. This machine was built according to specifications developed as a result of an extensive inquiry into the power patrol problem, in which the opinions of state, county, and local highway authorities were sought. Both International and Fordson tractors are used.

The new grader is pulled instead of being pushed, as is the usual method. The grader detaches from the tractor, saving the purchase of an extra power unit if the buyer already has a tractor. Power from the tractor controlled from the operator's seat raises and lowers either end of the blade and raises and lowers the scarifier. The operator has every control right at hand. The entire outfit, including tractor and grader, can be turned in 20 seconds on a 24-foot road, according to the manufacturer. Equipped with a

scarifier, this Patrolmobile will scarify gravel and water-bound macadam to take out all ruts and corrugations and will adequately handle the job of gravel-road maintenance with only one operator instead of the two previously required with grader and tractor. The grader weighs 4,100 pounds, has an 8-, 10-, or 12-foot blade, arched 19 inches. The blade is 16 inches wide, $\frac{1}{2}$ -inch thick, and are equipped with take-ups at the wearing machine is equipped with cut gears which run in oil-tight housings, all the bearings are babbitted and are equipped with take-ups at the wearing points. The wheels are provided with Hyatt heavy-duty speed bearings. The grader is operated by the mechanical power take-off of the tractor.

The Patrolmobile grader is designed for any of the road tractors, from a rating of 8 horsepower to 12-20 tractors. Each tractor requires a different hitch item to the grader, but such tractors as the International, Fordson, and Twin City are fitted for this equipment.

A Power Unit for Light Trucks

New Development Said to Cut Operating Expense in Half

A COMPLETE standard unit which is said to fulfill the need of a gear-shift control instead of the customary planetary transmission bands of the Ford, has been developed by the Mohawk Motors Corporation, Peoria, Ill. This Mohawk power unit is claimed to save from 30 to 50 per cent in gasoline and from 400 to 500 per cent in oil.

The Mohawk power unit consists of a complete engine and transmission. Since the motor is 80 per cent of the equipment of any car or truck, developments along these lines are of interest. The manufacturers state that the S. A. E. horse-power rating on a Ford motor is 22.4, and approximately 7 on the Mohawk power unit. However, behind the transmission, after going through all possible friction losses, the Ford shows 14 horse-power and the Mohawk 30 horse-power;

thus an increase of approximately 40 per cent in horse-power is effected where the gaging of power counts, and a mileage of 22 to the gallon with the Mohawk is secured, against 14 for the Ford.

The Mohawk unit consists of a motor complete with a Ricardo high-compression head, a super-head intake and exhaust manifold cast in one; a clutch with two pedals and all necessary attaching parts, and the transmission with complete rear housing and universal joint connections, including all necessary parts for installing, together with complete instructions.

The transmission is provided with three speeds forward and one reverse, which is identical with the transmission used on larger cars or trucks having large motors. The clutch has a gear-shifting lever of the standard ball shift type, and the shifting forks are of heavy forged steel.

EASTON

DISTRIBUTORS

John D. Turner Co., Birmingham, Alabama

*Concrete Machinery & Supply Company,
2014 Santa Fe Ave., Los Angeles, Calif.

Edw. R. Bacon Co., Folsom at 17th St., San
Francisco, Calif.

*K. B. Noble Company, 247 Pearl St., Hart-
ford, Conn.

A. B. Moore, Jr., Savannah, Ga.

Engineering Products Company, Chicago, Ill.

*Easton Car & Construction Company, New
York City

*Browster & Williams, 613 Dittlage Bldg.,
Syracuse, N. Y.

*Queen City Supply Co., Cincinnati, Ohio

*W. M. Patton Supply Company, 777 Rock-
wall Ave., Cleveland, Ohio

De Huff & Hopkins, Philadelphia, Pa.

*Easton Car & Construction Co., Pittsburgh,
Pa.

Northwest Equipment Co., Inc., Butte, Mont.

Flexner & Flexner, Louisville, Ky.

*Henry H. Meyer Co., 110 So. Howard St.,
Baltimore, Md.

*Hodge & Matthews Co., 50 Dorchester Ave.,
Boston, Mass.

Tulley Equipment Co., St. Louis, Mo.

*Fuchs Equipment Co., 1003 Farnam Street,
Omaha, Nebraska

Standard Machinery & Equipment Co.,
Spartanburg, S. C.

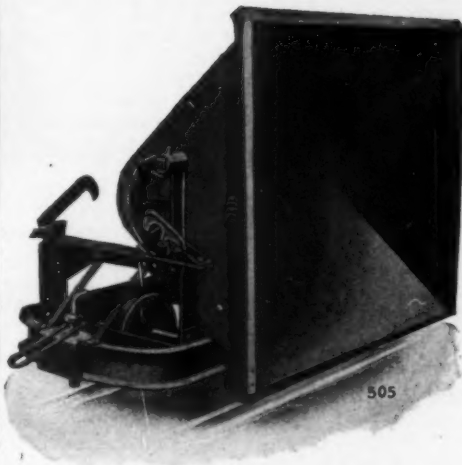
Equipment Sales Co., Nashville, Tenn.

R. B. Everett & Co., Houston, Texas

The Graham B. Bright Co., Richmond, Va.

La Lanes Equipment Co., Huntington, W. Va.

*Show Easton Equipment in their Own
Catalogues.



STANDARD ROCKER DUMP CAR

affords Easy Control—Speedy Action—
Full “water-level” Capacity, fifteen or
twenty per cent greater than bodies
with drooping ends.

The locking levers for holding the body in an
upright position are automatic in action giving
speed to the entire operation. (Patent Latches
holding the body in a semi or in a fully dumped
position can be furnished if desired.)

*Write for detailed information
and Easton Catalog.*

EASTON CARS

FOR EVERY INDUSTRIAL PURPOSE

EASTON CAR & CONSTRUCTION CO.

Offices and Works

KANSAS CITY, MO.

EASTON, PA.

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

A Relay Drive for Motor Trucks

Claimed to Be Most Remarkable Development Since the Self-Starter

THE features claimed by the Commerce Motor Truck Company, Ypsilanti, Mich., for its relay drive, include 114 per cent more power to the wheels than can be obtained by the conventional drive. It is said to be practically impossible to stick the Commerce relay. Riding comfort on solid tires is far superior to that obtained with pneumatics using any other type of drive; this naturally greatly increases the chassis life and is said to double the tire mileage. A speed of 35 miles an hour can be secured without damage to the chassis or to solid tires. This relay drive is flexible, greatly reducing any possible damage to gears, universal joints, or the power transmitting parts.

This unit was displayed on a 3½-ton Commerce truck at the Chicago Road Show, and a duplicate of the truck on display at the Show was demon-



THE COMMERCE TRUCK

strated under actual operating conditions at a near-by field.

A Compact, Light-Weight, All-Purpose Shovel

Unit Is Easy to Handle and to Get Into and Out of Tight Places

A NEW power shovel which has several distinctive features has been developed by the Star Drilling Machine Company, Akron, Ohio, and is known as the Star power shovel. This shovel has no swinging boom on the grading or shoveling attachments. The usual form of shovel construction has a heavy boom swinging on an outside pivot, while the Star shovel has a telescoping handle. By telescoping the loaded bucket back into the machine, the shovel can be revolved on its traction treads in a very short radius. This also does away with the weights which are usually needed to counterbalance a heavy boom on one end.

The manufacturers claim that this shovel will do the same work as boom type shovels that weigh 7 to 14 tons more. The shovel may be equipped with three types of bucket for grading, subgrading, or ditcher and clamshell work.

The boomless grading bucket has an 11-foot horizontal crowd, a revolving radius of 10½ feet,

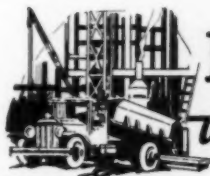
and a floor digging radius of 21 feet, as well as a dumping elevation of 17 feet. The ditcher bucket is of the boom and pull-in type. The rear end of the pivotal axle is clamped to the telescope rack, and can be fastened at any point on the rack selected by the operator as most suited for the work at hand, thus giving a longer or a shorter boom as desired. By means of a patented device the scoop can be held in a horizontal position during its entire stroke, regardless of the angle taken by the boom or the ditcher scoop, thus giving a planing action. Excavations such as cellar or other sub-digging work can be made 20 feet below the base of the machine, which greatly facilitates work and saves time.

The Star shovel, which weighs 14 tons and exerts a weight of approximately 8 pounds per square inch on its tractor bearing surface, is equipped with a 4-cylinder Waukesha Ricardo head gasoline motor rated at 60 horsepower at 1,000 r. p. m.

Sanderson-Cyclone Drill Co. Purchases W-S-M Motor Division

THE Sanderson-Cyclone Drill Co., Orrville, Ohio, has announced that it has purchased in its entirety the Motor Division of the Wellman-Seaver-Morgan Co., Cleveland, Ohio. In the agreement covering this purchase, all drawings and patterns, special machinery, tools and jigs, inventory, and good-will of W-S-M engines were transferred to the Sanderson-Cyclone Drill Co., and all the physical property has been moved to the new factory at Orrville, Ohio, where the engines are now being built and serviced.

Arrangements have further been made so that practically all former heads of the Engineering and Manufacturing Departments of the Motor Division of the Wellman-Seaver-Morgan Co. are with the Sanderson Cyclone Drill Co. in the same capacities. John Riise, formerly Chief Engineer, who has been largely responsible for the design and development of the W-S-M engine, now holds the same position at Orrville. In addition, the services of the shop superintendent and the foremen of the machinery department, the erecting de-



EVERY WALL *costs less* with HAWLEY TIE BOLTS



Placed in forms
from one side,
requiring no one
between forms.

Tie Bolts are
used over and
over again.

Rod left in wall
costs no more
than wire cut
and placed.

*"Hawley Tie Bolts have saved
half the cost of tying, when used
in bridge construction," says
Harry C. Holmes.*

*"Preferred to any other scheme
that we have ever tried in wall
work," say Contractors on
Kansas City, Mo., Water Works
project.*

Write for Circular

Distributors in Principal Cities

HAWLEY TIE BOLT COMPANY

4715 THIRD AVENUE SOUTH, MINNEAPOLIS, MINN.

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

partment, and the testing department have also been secured.

The purchase of the W-S-M engines, therefore, will not involve any radical changes in engineering or manufacturing policies, but has to do mainly with the manufacturing location, executive control, and selling and servicing policies, for which the Sanderson-Cyclone Drill Co. is well equipped. It has a new and modern plant located on a 35-

acre tract at the edge of Orrville, Ohio, it is close to raw material markets, and possesses excellent shipping facilities on three main line railroads. Further, the manufacture of this engine fits in well with the present line of mining, quarry, construction, water-well and oil-well machinery, drills, tools, gasoline and steam engines, which the Sanderson-Cyclone Drill Co. has been manufacturing for the last 30 years.

A Digging Bucket Built for Hard Work

Bucket Built to Stand the Roughest Treatment

THERE is probably no piece of contracting equipment which gets much rougher usage than the clamshell, orange-peel, or other digging bucket, which is liable to be dropped on a pile of rock and then closed up quickly to get its load, swung around to load the waiting truck, and then back to the pile. The Bradley-Badger Engineering Company, Inc., 11253 Michigan Avenue, Chicago, Ill., has developed a new bucket for which it claims particular merit.

It is said that this bucket will dig its full capacity at every load, has interchangeable parts

with no offset casting, and has particularly powerful leverage. The reaving on the Bradley-Badger bucket is in one direction only, there being no criss-cross, thus assuring less wear on the rope. The moving parts are at all times clear of the material, which lengthens their lives. The curve of the bucket promotes easy digging, and the strong, well-made reinforced sides increase the life of the unit. There is an increased leverage on the bucket as it closes without increasing the stress on the closing line, so that every last foot of material can be grabbed out of the pile.



HOW GEORGE J. ATWELL KEEPS A LOT OF WATER OUT OF A BIG HOLE

The George J. Atwell Company, contractors for the foundation of the new New York Life Insurance Building on the site of the old Madison Square Garden, found it necessary to remove water from an excavation 70 feet deep. A Humphreys lift and force trench pump was installed, as shown in this illustration. It has been working practically continuously with a suction lift of 20 feet and a discharge head of 50 feet, keeping the excavation dry. While the discharge head is but 50 feet, the actual length of the discharge hose is over 100 feet, that being the length necessary to carry the line to the street gutter at the nearest point.

Battery of 100 H. P. Waukesha Industrial Units at Tonkawa, Oklahoma



**\$10.00
a
Minute**

That's what it costs in production loss if this plant is shut down. Continuously, night and day these super duty Waukesha Power Units toll, delivering gas at 250 pounds pressure from the two-stage 10 x 4½ x 10 gas compressors that they drive. You may not need an engine for 24-hour duty, but every Waukesha Industrial Power Unit has the stamina and reliability necessary to deliver it.

Complete units, varying in size from 15 to 100 horsepower and fully weather proofed, are available for use either as an auxiliary power unit or for driving equipment on which they are mounted. Write for "Industrial Bulletin."

INDUSTRIAL EQUIPMENT DIVISION

WAUKESHA MOTOR COMPANY

Waukesha Wisconsin

New York	Kansas City	Denver	Tulsa	Houston	Long Beach, Calif.
<i>Acolian Building</i>	<i>V. L. Phillips Co.</i>	<i>Wilson Macky. Co.</i>	<i>C. F. Camp Co.</i>	<i>Portable Rotary Rig Co.</i>	<i>Star Drilling Machine Co.</i>

Exclusive Builders of Heavy Duty Gasoline Engines Over Twenty Years

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you

New Model Bucket Loader

Unit Available with Electric or Gasoline Engine Drive

A NEW Model-25 bucket loader has been developed by the Barber-Greene Company, 485 Park Avenue, Aurora, Ill., as companion to the successful Model-42 loader. The main frame of this loader is built up of structural angles, channels, and plates, hot riveted together, making it strong and rigid. The driving machinery is completely housed from dirt, with removable cover plates in the housing for accessibility.

The crawlers have three-point suspension with self-cleaning links, 10 inches wide, chilled rollers and cast iron sprockets. The crawler frames are made of structural steel, using 7-inch channels and providing a take-up for the crawler drive chains by means of filler blocks inserted in steel pockets. The loader travels 30 feet per minute in low, 60 feet per minute in second, and 100 feet per minute in high and reverse, out of the material. Power is either a General Electric 10-horsepower motor or a Le Roi gasoline engine developing 15 horsepower at 1,200 r.p.m..

The buckets, made of malleable iron, measure 18 x 8 inches and are spaced 18 inches on centers on two strands of 742 chain. The 30-inch patented revolving disc feed and scraper is the same as on earlier Barber-Greene loaders.

This loader is rated at one cubic yard per minute in free-flowing material. It may be equipped with a swivel spout, and has a strike-off hopper of 14 cubic feet maximum capacity or a standard overflow type hopper with a filled capacity of 12 cubic feet.

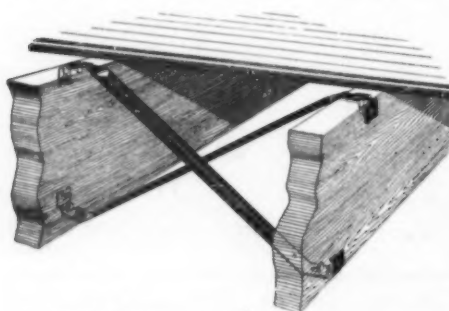


THE NEW BARBER-GREENE MODEL-25 LOADER

A Tension Bridging for Floor Framing

New Steel Bridging Needs No Nails for Fastening to Tie Wood Joists

A NEW type of steel bridging has been invented for reinforcing wood floors and floor framing. It is new because it is a tension bridging, whereas wood and other steel bridgings have



BLAW-KNOX STEEL BRIDGING IN PLACE

been compression bridgings. Another interesting feature of this product, called Tru-Tye bridging, made by the Blaw-Knox Company, Pittsburgh, Pa., is that it is complete and ready to install and does not need any nails for fastening to tie wood joists. The prongs are stamped out of the metal with points sharp enough to drive easily into the wood, taking the place of nails.

This new steel bridging can be used successfully for the many different conditions that occur in house framing. For narrow or wide spacing occasioned by framing around chimneys or bathroom plumbing, Tru-Tye bridging can be installed without difficulty by bending and driving the prongs into the side of the joists instead of the bottom. For regular spacing, the prongs are driven into the top or bottom of the joist, and an end prong is bent over and driven into the side, thus providing a secure anchorage. This bridging is made of black strip steel, corrugated to give

"E-Z" STEEL ROAD FORMS "E-Z"

"E-Z" STEEL BUILDING FORMS "E-Z"

A HOTCHKISS DEVELOPMENT

for the

**Construction of Concrete Walks,
Curbs, Gutters, Drives, Building Foun-
dations, etc., and All Sizes of Each.**

The following list of Hotchkiss representatives are ready to furnish you with data and advice on your problems.

Lee T. Ward Company Philadelphia, Pa.	Bacon Engineering Sales Co. Cleveland, Ohio
Wheeler-Murray Co. Buffalo, N. Y.	National Supply Co. Toledo, Ohio
Ward Equipment Co. Pittsburgh, Pa.	McLaughlin Mill & Sup. Co. Hammond, Ind.
Ginsberg-Penn Co. New York, N. Y.	S. H. Edlin Co. Indianapolis, Ind.
H. S. B. Settle Wyoming, N. J.	Wagner Sales Co. Knoxville, Tenn.
John C. Louis Baltimore, Md.	B. B. Wilson Co. Lexington, Ky.
Yancey Bros. Atlanta, Ga.	Southern States Equip. Co. New Orleans, La.
McDonald & Burgman Daytona, Fla.	Amer. Hdware & Equip. Co. Charlotte, N. C.
Fickeissen-Finney Equip. Co. St. Louis, Mo.	C. W. Blakeslee & Sons New Haven, Conn.
Concrete Mch. & Supply Co. Los Angeles, Calif.	Allen R. Boudinot Davenport, Ia.
Minneapolis Equipment Co. Minneapolis, Minn.	Graham B. Bright Co. Richmond, Va.
Standard Salt & Cement Co. Duluth, Minn.	R. H. Hyland Co. Chicago, Ill.
Huebner Sales Company Saginaw, Mich.	Contractors' Equip. Co. Miami, Fla.

DESCRIPTIVE PAMPHLETS MAILED ON REQUEST

Hotchkiss Steel Products Company, Inc.

Binghamton, N. Y.

strength and coated with acid-proof paint to make it rust-proof. It has a neat appearance and is a great improvement over the old-fashioned wood bridging. Carpenters will like to use them as they are easily installed and do away with what was

formerly a tedious and tiresome job. These ties are packed in cartons of one hundred weighing about 40 pounds. Standard sizes are for 6-, 8-, and 10-inch joists spaced on 12 inch and 16-inch centers.

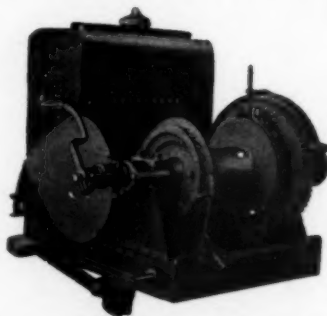
Two New Small Gasoline Hoists

Units Made in 10- and 18-Horsepower Sizes for Loads of 1,500 and 2,500 Pounds Line Pull

A NEW small gasoline hoist made in two sizes has been announced by the S. Flory Manufacturing Company, Bangor, Pa. The first, a 10-horsepower single friction drum hoist, handles a load of 1,500 pounds on a single line at 160 feet per minute, and the second, an 18-horsepower hoist, has a capacity of 2,500 pounds line pull at 200 feet per minute. Both these machines, which are equipped with Continental motors, are said by the manufacturer to be over-powered to insure long life and dependable load capacity at all times.

The hoists are equipped with cut gears, asbestos frictions and brakes, shrouded ratchets bolted to the drums, convertible bed plates, Flory non-heating friction nuts, machine-fitted bearings and caps, machine-ground shafts, Alemite lubrication, and other distinctive features, tending to improve the service and life of the equipment.

The hoist may be secured with a two-speed reversing sheave operating independently of the drums, and may also be secured equipped with the Flory swinging gear attachment. The hoists are



THE NEW SMALL FLORY GASOLINE HOIST WITH OVER-SIZE MOTOR

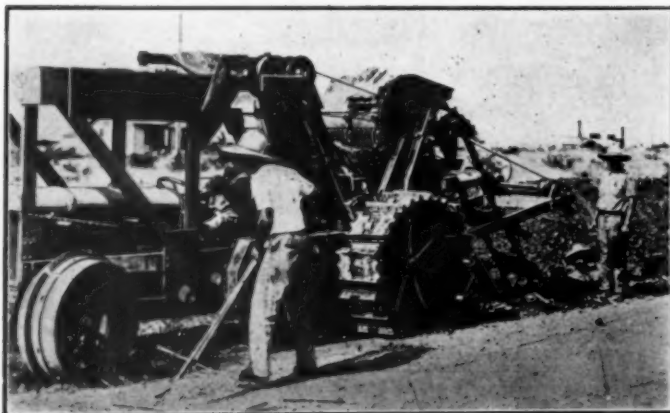
built in quantity production to jigs and fixtures and are carried in stock at the factory and in the warehouses of numerous distributors throughout the world.

T. L. Smith Distributors in St. Louis

IN the April, 1926, issue of CONTRACTORS' & ENGINEERS' MONTHLY mention was made of the fact that O. B. Avery is now handling the Smith paver account in St. Louis. This item did not intend to convey the impression that O. B. Avery had the entire T. L. Smith account. The Geo. F. Smith Company, Franklin and Channing

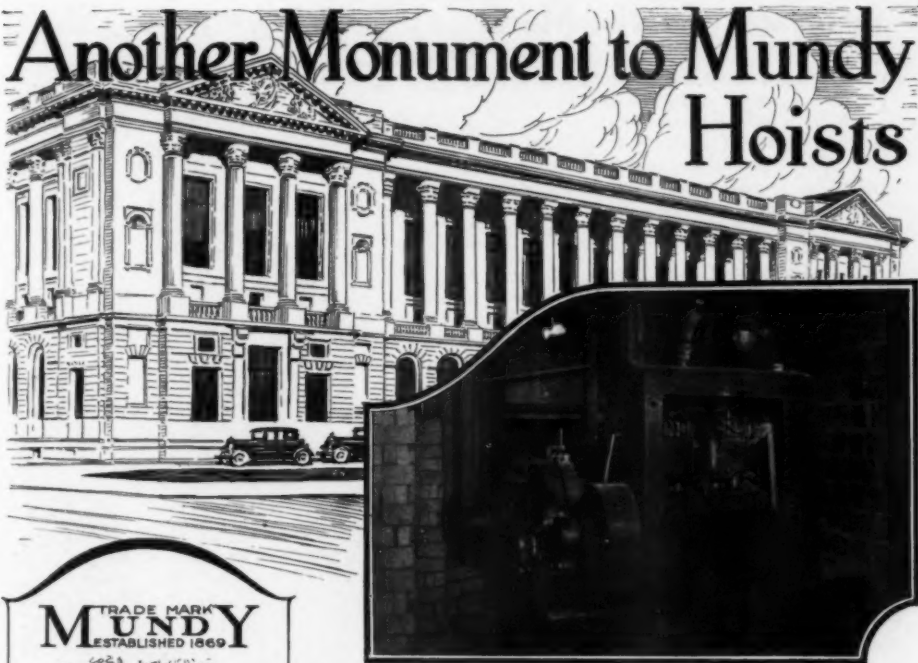
Avenues, St. Louis, Mo., which has been representing the T. L. Smith account, including their paver account in the St. Louis territory, for 17 years, relinquished the paver account to O. B. Avery, but the Geo. F. Smith Company still has the exclusive contract for all T. L. Smith products, with the single exception of the paver.

Fordson-operated Excavator an Effective Outfit

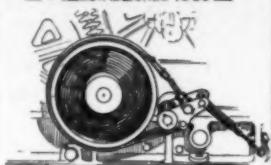


TOPPING EXCAVATOR EQUIPPED WITH GRID IRON GRIP WHEELS, OWNED BY THE FRASER CONSTRUCTION COMPANY, SAN ANTONIO, TEXAS

Another Monument to Mundy Hoists



TRADE MARK
MUNDY
ESTABLISHED 1869



Automatic Safety Brake

COMPOSED of a brake wheel keyed to the intermediate shaft of the hoist, upon which an asbestos lined brake is mounted, this new automatic safety brake holds the load if the current is interrupted. This brake is standard equipment on Mundy gasoline and electric hoists.

To Equipment Distributors:

Some open exclusive Sales Territory is now available.

THE new Public Library recently built in Philadelphia, Pennsylvania, at a cost of \$1,250,000 is one of the finest examples of the builder's art. During the construction of this building, Mundy high speed gasoline hoists were used for hoisting brick and tile in material elevators. Eight other Mundy hoists raised and placed the stone work on this job.

Mundy Hoists are widely known among contractors for this kind of work, both the gasoline and the electric types. Built with Asbestall non-burn frictions these hoists will withstand heavy loads on long lifts at high speeds.

Asbestall frictions have a higher gripping power than wood frictions and are not affected by oil or moisture.

Due to this they will not warp as is universally the case with wood frictions. Though these frictions have been in use nearly five years, there has never been a repair order for them. These Asbestall frictions are fully described in a new 40-page book on Gasoline Hoisting Equipment which has just been published. You can get your copy by dropping a card.

The Mundy Sales Corporation

Distributors for the J. S. Mundy Hoisting Engine Co.

30 Church St., New York

Agents in Principal Cities

MUNDY HOISTS

THE HOIST WITH THE ASBESTALL FRICTIONS

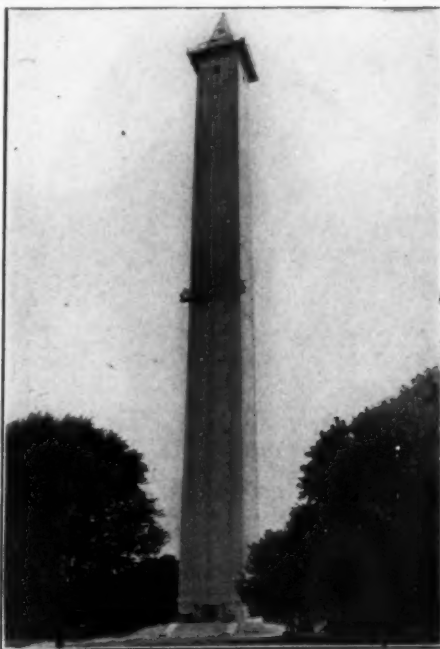
When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you,

Jefferson Davis Monument---A Concrete Shaft

THE contract for building the Jefferson Davis concrete monument, at Fairview, Ky., was let in March, 1917, and work was begun the following month. The first concrete was poured June 7, 1917. On October 4, 1918, because of the World War, it was requested by the United States Government that work on the monument be stopped as non-essential. At that time the obelisk was 175 feet high.

Work began again in August, 1921. For lack of funds, work was suspended June 20, 1922, but was again resumed August 15, 1923. The monument was completed and dedicated on June 7, 1924, just seven years from the date of pouring the first concrete. The obelisk stands 351 feet high, being the second tallest monument in the United States and the tallest concrete shaft. The Washington Monument, a masonry shaft, stands 555 feet high. The Jefferson Davis Monument measures 35 feet square at the base and weighs approximately 1,500,000 tons. It rests on a foundation of concrete 19 feet underground, beneath which is a solid rock foundation of limestone. The monument cost \$175,000.

The illustration shows the monument just before completion, while the Berg concrete surfacers and finishers were being used to remove form marks and fins on the face of the shaft to give it an attractive uniform finish. The method of using light-weight motors slung from the shoulders of the operators has proved very effective.



THE JEFFERSON DAVIS MONUMENT JUST BEFORE COMPLETION

Miscellaneous Notes

Ryerson Acquires Another Reinforcing Bar Plant

JOSEPH T. RYERSON & SONS, Inc., has taken over the reinforcing bar division of the Penn Metal Company, Boston, Mass., and will immediately add to the sizes and tonnage carried. General sales offices have been opened at 677 Concord Avenue, Cambridge, Mass.

Wonder Mixer President Sails

H. B. LICHTY, President, Construction Machinery Company, Waterloo, Iowa, manufacturer of Wonder tilting mixers, sailed on April 10 for England, where he is to spend several months in traveling through a number of countries in the interest of the Construction Machinery Company.

New Heil Representative in Los Angeles

THE Heil Company, Milwaukee, Wis., has announced the appointment of Fred A. Koester, 440 Seaton Street, Los Angeles, Calif., as its representative for Heil hoists in southern California. Mr. Koester, formerly Superintendent of the Pacific Gas and Electric

Company, is well qualified to handle the distribution of this hoist, as the company for which he worked operated a fleet of twenty trucks all equipped with Heil hoists.

Dewey Now General Manager of Wood Hoist

THE Wood Hydraulic Hoist & Body Company, 7936 Riopelle Street, Detroit, Mich., has announced the appointment of Frank H. Dewey as General Manager of the company. Mr. Dewey has a wide technical and executive experience, and for several years prior to coming to Detroit he was a designer for the United States Navy. His first connection in Detroit was with the Packard Motor Car Company, for which he organized a special equipment department of the truck division. Later he became Detroit representative of the Horizontal Hydraulic Hoist Company of Milwaukee, which company in 1920 was purchased by Gar Wood and the business moved to Detroit and absorbed by the Wood Hydraulic Hoist & Body Company. Since this time Mr. Dewey has been associated with the company, for several years in the capacity of Assistant General Manager.

HIMICO

TRANSMISSIONS

POWER PLANTS

Low Cost Haulage

With the opening of Spring construction, particularly of Roads, Streets and Highways of every type the attention of the contractor is again focussed on his cost per ton of material in place.

Building roads and in fact every class of construction is simply a problem of moving weight from one form to another, translating masses of crushed rock, sand, gravel and cement into enduring concrete; so that the element of cost of handling and moving these materials enters largely into the total price of the completed job.

HIMICO Cuts Haulage Costs

With Ford trucks equipped with Himico Sliding Gear transmissions the contractor can reduce his haulage cost very materially. His trucks give less trouble, cost but little for repairs, are in service when other and heavier vehicles are laid up, and the Ford-Himico truck does not cut up the sub-base of the roadway as heavier trucks do.

Drivers can be recruited from any class of help available and the investment in Ford-Himico equipment is but small; so interest charges and depreciation items make but a small element of expense as compared with a large carrying charge for the heavy truck.

The answer for the contractor is

HIMICO

Himico transmissions fit Ford cars or trucks without alteration or butchery of the chassis. They are easy to install and keep in service.

Price of Himico 3 speed sliding gear transmission, in-

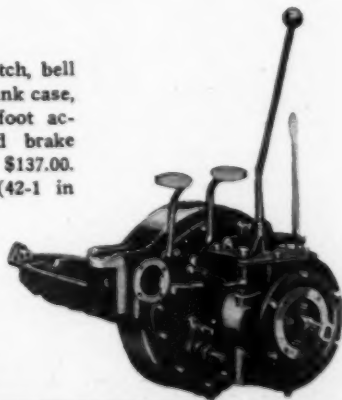
cluding fly-wheel, clutch, bell housing, improved crank case, transmission brake, foot accelerator, clutch and brake pedals, assembled \$137.00. 4th forward speed (42-1 in low) extra \$15.00.

HINKLEY MOTORS, INC.

*Builders of Famous Hinkley Heavy
Duty Automotive Engines*

P.O. Box E-839

DETROIT, MICHIGAN



When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.



Selected Catalogs

The catalogs and pamphlets listed below are available for free distribution. Contractors and Engineers who check over these pages each month and write for such material as interests them, will find this a valuable means of keeping up to date on the subject of machinery and equipment.

A DEVICE FOR LAYING PARKWAY CABLE

A new attachment to the Killefer 20 or 25 machine, made by the Killefer Mfg. Co., Box 270, Huntington Park, Los Angeles, Calif., has been developed for laying light cable for street-lighting purposes without the expense of trench digging and filling. This device is described in literature which may be secured on request.

DEPENDABLE ENGINES WITH FIRST-RATE SERVICE

The Climax Engineering Co., 1 W. 18th Ave., Clinton, Iowa, will be pleased to furnish contractors with a list of the manufacturers of worth-while contracting equipment which makes use of the Climax engine as a power-plant, as well as a list of the Climax parts and service stations which are distributed throughout the United States at quickly accessible points.

A COMBINED TRACTOR AND AIR-COMPRESSOR

The Curtis portable compressor and Fordson combined, which costs less than an ordinary engine-driven portable compressor, is described in Illustrated Bulletin C-4-B which may be secured from the Curtis Pneumatic Machinery Co., 1931 Kienlen Ave., St. Louis, Mo.

A NEW GENERAL ROAD MACHINERY CATALOG

The Austin-Western Road Machinery Co., 400 N. Michigan Blvd., Chicago, Ill., has just issued its new general catalog No. 26, which, besides containing revised specifications and descriptions of the older models, contains descriptions of several entirely new machines, such as the Mammoth Junior grader, the Austin-International 10-20 and 15-30 motor graders, the Western road-metal plant, and the Western street excavator.

A ROAD FORM WITH A WEDGE LOCK

Bulletin 45-M issued by the Lakewood Engineering Co., Cleveland, Ohio, describes the Carr road form, which has a wedge lock joint that saves work behind the finisher because it aligns the top surface of the form securely and eliminates waves in the road surface from weak or loose joints.

A 32-PAGE CATALOG ON DIRT MOVING

Catalog No. 209-A, which the Baker Mfg. Co., 585 Stanford Ave., Springfield, Ill., has prepared, describes completely Baker-Maney wheel scrapers, which are quick loading and unloading and save the labor of many men and teams.

COMPLETE PORTABLE ROCK-DRILLING PLANTS

The latest literature of the Ingersoll-Rand Co., 11 Broadway, New York, describes the efficient combination of correct size of compressor and rock drills for any particular job, thus showing you how to effect over-all economy in low fuel and air consumption and at the same time produce a maximum amount of work done.

CONCRETE MANUFACTURING EQUIPMENT

Blaw-Knox products, which have met the approval of contractors throughout the United States, are described in literature which may be secured from the Blaw-Knox Co., Pittsburgh, Pa. These products include: all-steel, self-cleaning batcher plants for central mixing and proportioning; adjustable measuring batchers for measurement by volume and by weight; the Inundation System to insure constant concrete by absolute water control; steel forms for roads and streets, sidewalks and curbs and for general construction; clam-shell buckets for all kinds of digging and rehandling; turntables for the easy turning of motor trucks of any size; and standardized steel buildings for housing men, materials, and equipment.

A WHEELBARROW BUILT FOR WORK

Bullfrog wheelbarrows, which are designed as well as built for work and which make it possible for a man to work better and more effectively, are described in the latest literature of the Toledo Wheelbarrow Co., Toledo, Ohio.

HIGH-GRADE MIXERS PRODUCING LOW-COST CONCRETE

Concrete mixers which have the minimum "time out" for repairs, in which there are no breakdowns to tie up a crew and eat up profits, and which are made in small sizes as trailer mixers, equipped with steel wheels, pneumatic or cushion tires and which run up to larger sizes, are described in the catalog of the Jaeger Machine Co., 701 Dublin Ave., Columbus, Ohio.

RELIABLE CONTRACTORS' TRANSITS

Folder T-18 issued by Warren-Knight Co., 136 N. 12th St., Philadelphia, Pa., describes the Sterling contractors' transit, which is made in various sizes for different kinds of work.

DEPENDABLE DUMP-WAGONS

One of the worth-while features of Watson dump-wagons is that the wheels are standard with 10-inch hubs and nothing but the highest grade second-growth oak or hickory spokes and rims. More information regarding these dependable dump-wagons may be secured from the Rex-Watson Corp., Canastota, N. Y.

GASOLINE LOCOMOTIVES THAT YOU CAN STANDARDIZE ON

Whitcomb gasoline locomotives made for any gage and in all sizes from 2½ to 25 tons, for hauling yardage, road forms, batch-boxes, and other materials used in modern road building, are described in literature of the Geo. B. Whitcomb Co., Rochelle, Ill.

AN IMPROVED ONE-SACK MIXER

The Republic Model Z-10-LT sack-size mixer, which has the largest drum of any sack-size mixer built and a steeper elevating skip, is described in an illustrated folder which may be secured from the Republic Iron Works, Tecumseh, Mich.

PUMPS BUILT TO STAND THE GAFF

Humphreys diaphragm pumps, which are built for dependability, capacity, high-suction lift with outside guided discharge valves, non-clogging suction valves, and large direct waterways, are described in the literature of the Humphreys Mfg. Co., Mansfield, Ohio.

A MODERN LINE OF ROLLERS AND GRADERS

Gallon rollers, graders, and maintainers, which offer admirable service in the road machinery field and are backed by branch stocks, distributors, and service men located at points where they can give prompt service in the field, are described in literature which may be secured from the Gallon Iron Works and Mfg. Co., Gallon, Ohio.

GASOLINE POWER FOR SHOVELS AND DIGGERS

Hercules engines, which work faithfully from the time the switch is turned on until the switch is turned off, steadily delivering power to the contracting equipment on which they are mounted, are described completely in the specification literature of the Hercules Motors Corp., Canton, Ohio.

6-FOOT ALUMINUM RULES

Complete information on the Lufkin 6-foot folding aluminum rule, which is graduated in tenths and hundredths of inches on one side and with the usual graduations on the other and which also has a folding hook at the end to facilitate measurements, may be secured from N. A. Ellis, Sales Dept., Lufkin Rule Co., Saginaw, Mich.

ROAD BUILDERS' REPORTS ON TRUCKS

The Autocar Co., Ardmore, Pa., has published in its Road Building issue of the Autocar Messenger 48 pages of interesting descriptive matter, text, illustrations, and reports on the work of Autocar trucks in road building.

AN ENTIRELY AUTOMATIC DUMP BODY


The Anthony gravity-dump body, which is entirely automatic in operation, requiring only slight pressure on the trip lever to dump it and which is held by two legs at a 45-degree angle for complete discharge, is described in the latest catalog of the Anthony Co., Inc., Streator, Ill.




CURB AND GUTTER


CURB


INTEGRAL CURB AND BASE


BATTLED CURB


SIDEWALK


ROAD FORMS


FINISHING MACHINES



STRIKEOFFS


TRAIL GRADERS


SEWAGE TESTERS


TRAVELING BRIDGE


CAR ENCLOSURES


MORTAR BOARD


TOOL BOXES



Wayne County, Mich. Ind.
HELTZEL Steel Forms were
Used and Shipped

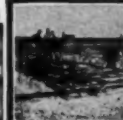
One of many projects in
Wayne County, Michigan,
completed with HELTZEL
Curb and Gutter Forms.




An idea of how HELTZEL Sidewalk Forms are used by J. K. Shinn & Co. and Indrio Construction Co. in the new city of Indrio, Florida.

Write for 1926 Catalogs on Steel Road Forms,
Curb and Gutter Forms or Sidewalk Forms.

The Heltzel Steel Form & Iron Co.
Warren, Ohio


JOINT MACHINES


BATCH BOXES


BATCHER


TRAILER BATCHING MIX


SEALED CART BOX


REINFORCING FORMS


PIPE FORMS


SEWER FORMS

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

SPEEDY, DEPENDABLE CLUTCHES

Twin Disc clutches, which are speedy and dependable, built for road-making machinery, capable of handling the heaviest loads the machine can handle and doing it easily, surely, and constantly, are described in the literature of the Twin Disc Clutch Co., Racine, Wis.

CONCRETE FORMS FOR ROAD, CURB, AND GUTTER

The Hotchkiss system of concrete forms for road, curb and gutter, and sidewalks, is described completely in the latest literature of the Hotchkiss Steel Products Co., Inc., Binghamton, N. Y.

STANDARD TWO-BATCH-BOX CARS

The Easton Car & Const. Co., Easton, Pa., will be pleased to send its literature describing in detail the Easton standard square frame two-batch-box road car, which is unique, in that opposite pedestals are securely tied together across the car with angle-iron cross-ties. This catalog also describes Easton batch-boxes and other road equipment.

A SINGLE FRICTION DRUM HOIST FOR LIGHT WORK

The Dobbie hoist, which is direct-connected to a 2-cylinder hopper-cooled gasoline engine and which has centrally located hand and foot levers, a bed frame of structural steel, and approved band friction type drum clutch, is described in the literature and specifications issued by the Dobbie Foundry and Machine Co., Niagara Falls, N. Y.

EVEN, STEADY POWER FROM THE FORDSON

By installing a Pickering governor on your Fordson, you have a better tractor in every way, one that delivers steady, even power and that runs at uniform speed at all times. Just how this is made possible is told in the free illustrated Pamphlet No. 016B issued by the Pickering Governor Co., Portland, Conn.

CONCRETE PRODUCTS MACHINERY

The Raber & Lang Mfg. Co., 531 Mill St., Kendallville, Ind., will be glad to send you copies of its bulletins describing Crescent concrete products machinery: Catalog 11 describes sewer pipe molds; Bulletin 30, tile molds; Catalog 32, brick machines; Catalog 37, Bulldog batch mixers; Bulletin 42, Bulldog tilter mixers; Bulletin 36, power block tampers; and Catalog 10, Crescent continuous mixers.

SCRAPERS THAT REPLACE MEN AND TEAMS

A wide variety of services of the Crescent $\frac{1}{2}$ -yard scraper which replaced 8 men and teams in a gravel-pit in Ohio will be found in the literature of Sauserman Brothers, Inc., 464 S. Clinton St., Chicago, Ill.

MULTI-CYLINDER, ENGINE-DRIVEN, PORTABLE AIR-COMPRESSORS

Schramm portable air-compressors, which are driven by multi-cylinder engines and are built in two sizes with capacities of 120 and 165 cubic feet per minute with various mountings, are described in the latest catalog of Schramm, Inc., West Chester, Pa.

A MORTAR MIXER THAT REALLY MIXES

The Tal-Flo mortar mixer, made in 4-, 7-, and 14-cubic-foot sizes, turns out thoroughly mixed mortar in 8 to 10 seconds after material is placed in the hopper. Further information and details may be secured from the Talbot-Flood Mfg. Co., Inc., 521-23 Dwight Bldg., Kansas City, Mo.

AN IMPROVED COLD PATCH

The new Tarvia-KP has been improved to such an extent in its binding strength that 12 gallons now do the work of 18. Literature on this improved cold patch material may be secured from the Tarvia Dept., The Barrett Co., 40 Rector St., New York.

AN ENGINE THAT WORKS HARD EVERY DAY

The Beaver engine, which is built to be on the job every day on hard pulls or rough going and which has many features of design worth knowing, is described in the latest Bulletin issued by the Beaver Mfg. Co., 50 25th St., Milwaukee, Wis.

LOW-COST CRAWLER POWER FOR FORDSONS

Trackpulis, which give greater capacity to the Fordson, and the upkeep cost of which in combination with the Fordson, is said to be the lowest of any crawler type tractor, are described in the literature of the Belle City Mfg. Co., Racine, Wis.

A PLASTER MIXER THAT GIVES RESULTS

If you would like to know more about a plaster mixer which gives the most thorough mix of old-fashioned hair or hard wall plaster, scratch brown finish, gives a sanding plaster from 10 to 12 shovels heavier than when mixing by hand, and eliminates droppings because every batch is uniform, write to the Blystone Mfg. Co., 326 C St., Cambridge Springs, Pa., and ask for literature describing the Blystone Mixerette.

GASOLINE LOCOMOTIVES FOR THE HARDEST PULL

If you are interested in an 8-ton gear-drive gasoline locomotive that prominent contractors have found the best in the hardest pull, write for the catalog and performance bulletin issued by the Fate-Root-Heath Co., Plymouth Locomotive Works, Plymouth, Ohio.

A TANDEM ROLLER WITH GREAT POWER

Iroquois tandem rollers, which are famous for high power, quick reverse, long life, simplicity of construction, and low cost of maintenance, are described in the complete specifications circular of the Iroquois Sales Dept., Barber Asphalt Co., 1600 Arch St., Philadelphia, Pa.

STANDARD HOISTS AND DERRICKS

The Clyde Iron Works Sales Co., Duluth, Minn., will be pleased to furnish operating and upkeep costs as well as construction details covering its standard hoists and derricks for general contracting. A free illustrated booklet will be sent on request.

AN ENGINE WITH LOW AVERAGE REPAIR COST

The LeROI engine, which is built to operate contractors' equipment and which shows surprisingly low average repair parts costs, takes time out less frequently and stays active on the job long after the ordinary engine goes feeble, is described in the literature of the LeROI Co., Milwaukee, Wis.

POWER SHOVELS WITH WORLD'S RECORDS

Marion power shovels, which have a world-wide reputation for low-cost yardage and which hold world's records for yardage production in earth- and stone-moving projects, are built in both revolving and railroad types in capacities of $\frac{1}{2}$ to 8 yards. These shovels are described completely in literature which may be secured from the Marion Steam Shovel Co., Marion, Ohio.

WELDING AND CUTTING APPARATUS

If a contractor wishes to be independent of emergencies and be able to take care of a breakdown on an important contract, he should secure the details regarding the advantages of Milburn welding and cutting apparatus and portable carbide lights which are described in Booklet 323 issued by the Alexander Milburn Co., Baltimore, Md.

DURABLE, FAST, REASONABLE DUMP BODIES

Full automatic gravity-dump bodies which are quickly installed on Ford 1-ton trucks and which give you your money's worth in every way, are described in the Quickstrip line literature of the New York Central Iron Works Co., Inc., Hagerstown, Md.

A NEW ONE-MAN POWER CONTROL

A one-man power patrol grader with a detachable power unit for general road maintenance the grader blade of which is operated from the power take-off of the tractor, is described in literature which may be secured from the Stockland Road Machinery Co., Minneapolis, Minn.

A CRANE BUILT FOR SPEED

The Moore Speedcrane, named for its performance, is made in gasoline, steam, electric, crawler, and traction wheel types and is particularly adapted to road and yard service. Its manufacturers, the Moore Speedcrane Co., 39 S. La Salle St., Chicago, Ill., will be pleased to send an illustrated catalog giving details.

LARGE-CAPACITY, PORTABLE AIR-COMPRESSORS

The latest catalog of the O. K. Clutch & Machinery Co., Columbia, Pa., describes this company's line of large-capacity, portable air-compressors with a clutch for easy starting.

MEASURING-PLANTS TO SPEED UP ROAD WORK

Aggre-Meter bins and measuring-plants of 117 tons, 70 tons, 40 tons, 30 tons, and 23 tons capacities, as well as Peerless clamshell buckets, are described in the literature of the Erie Steel Construction Co., Erie, Pa.

A NEW TRAILER BIN AND BATCHER

The new Heltzel bin and batcher catalog, which will be of interest to contractors and engineers throughout the country, as it describes the new Heltzel trailer batcher bin, may be secured by any interested parties from the Heltzel Steel Form and Iron Co., Warren, Ohio.

A NEW POWER-PLANT FOR LIGHT TRUCKS

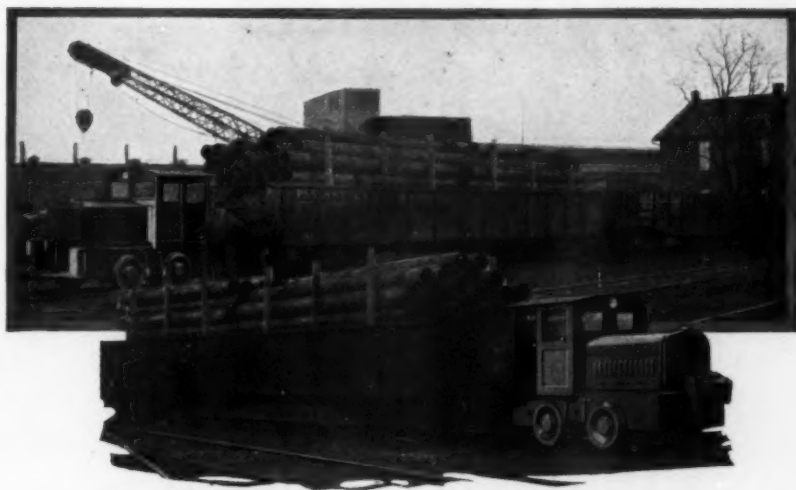
The Mohawk power unit for Ford cars and trucks, which is a complete power-plant with clutch and transmission for replacing the Ford engine and transmission, is described in an illustrated folder which may be secured from the Mohawk Motors Corp., Peoria, Ill.

A SINGLE OR DOUBLE-DRUM HOIST FOR THE FORDSON

The Pioneer Porta-Hoist, which is made as a single- or double-drum unit, reversible or non-reversible for mounting on the Fordson, is described in literature which may be secured from Pioneer Tractors, Inc., Winona, Minn.

HOIST RECORDS FOR MATERIAL HANDLING

On the construction of the new subway under N. Broad Street, Philadelphia, Pa., 15 Mundy hoists lifted 110,000 cubic yards of material in 26 days. Now 21 Mundy hoists are at work speedily removing the excavated material from shafts some 35 feet below the street. This is only one of the jobs on which these hoists have made a record. An attractive 40-page booklet describing Mundy gasoline hoists is ready for you and may be secured from the Mundy Sales Corp., 30 Church St., New York.



Faster Haulage—Lower Costs

Whitcomb Locomotives with their more than ample horse power per ton, assure rapid haulage at low cost.

Instances of haulage at less than $\frac{1}{2}$ cent per ton are not uncommon and when you consider the fact that maintenance is a negligible item and that a licensed operating crew is not necessary, it is easy to see how "Whitcombs" will fit into your haulage program.

For contract haulage, or switching cars at storage points, "Whitcombs" are ideal. They are made in all sizes and gauges and may be had powered by either gasoline engines, electric storage batteries, or fitted with a trolley.

Our Engineering Department is thoroughly conversant with all types of haulage problems and will be glad to help you select the proper type of locomotive for your work.

GEO. D. WHITCOMB COMPANY
ROCHELLE, ILLINOIS

Offices in principal cities



GASOLINE - STORAGE BATTERY - ELECTRIC
WHITCOMB
LOCOMOTIVES

When writing to advertisers, please mention the *Contractors' & Engineers' Monthly*—Thank you.

ERIE Buckets Aggre-Meter Plants



The Aggre-Meter—

The Aggre-Meter in the picture is the ERIE 117-ton all-steel Type F, for loading compartment trucks or batch boxes, or for loading batches direct into the mixer hopper.

This is the way to handle sand and stone quickly, easily and accurately. One man does the proportioning and loading as fast as motor trucks can haul the material away.

Furnished all-steel or combination steel - and - wood

The Bucket—

This is the ERIE 1-yd. "Peerless" Bucket, an all-'round contractors' and material handlers' bucket. Note the full grab. This bucket has great closing power—long cable life—takes a big load at every grab—and dumps quickly. The contractor is guaranteed that spare parts like the cutting lips will fit.

For extra hard digging or severe service see the Special Digger Bucket.

All-steel, with bushed bearings lubricated by forced feed.



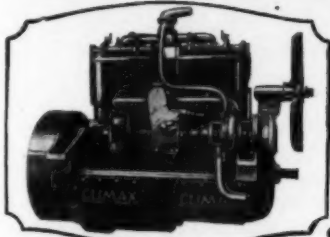
ERIE STEEL CONSTRUCTION CO.

Erie, Penna., U. S. A.

To transport this 70-ton Type F Aggre-meter Plant, detach columns and aggre-meters and load the bin on a truck or flat car. To ship the 117-ton plant, first remove the two sloping sides to give railroad clearance.



When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.



Climax "Trustworthy" Engines are used as Standard Equipment by:

Bay City Dredge Works, Bay City, Mich.
Brown Hoisting Mach. Co., Cleveland, O.
The Buhl Co., 407 South Dearborn St.,
Chicago, Ill.
Byers Machine Co., Ravenna, Ohio
Davenport Locomotive Works, Davenport,
Iowa
Equitable Asphalt Maintenance Co., Kansas
City, Mo.
Fate-Root-Heath Co., Plymouth, Ohio
Four Drive Tractor Co., Big Rapids, Mich.
Galion Iron Works & Mfg. Co., Galion, O.
Greiman Ditcher Co., Inc., Garner, Iowa
Industrial Works, Bay City, Mich.
J. T. Tractor Co., Cleveland, Ohio
Kennison Mfg. Co., Solomon, Kans.
Keystone Driller Co., Beaver Falls, Pa.
Lidgerwood Mfg. Co., New York, N. Y.
Link-Belt Co., Chicago, Ill.
Locomotive Crane Co. of America, Cham-
paign, Ill.
McMyer-Interstate Co., Cleveland, Ohio
Mid-West Locomotive Works, Cincinnati,
Ohio
Moore-Speedcrane Co., Chicago, Ill.
Mundie Manufacturing Co., Peru, Ill.
J. S. Mundy Hoisting Engine Co., Newark,
N. J.
Northern Pump Co., Minneapolis, Minn.
O. K. Clutch & Mach. Co., Columbus, Pa.
Orton Crane & Shovel Co., Chicago, Ill.
The Osgood Co., Marion, Ohio
Parsons Co., Newton, Iowa
Rix Compressed Air & Drill Co., San
Francisco, Calif.
The Russell & Co., Maestlin, Ohio
Vulcan Iron Works, Wilkes-Barre, Pa.
Geo. D. Whitcomb Co., Rochelle, Ill.
Winconsin Farm Tractor Co., Sauk City,
Wis.
W. T. Young Engine Co., Oil City, Pa.

Making "Mince-Meat" of old Macadam Road —A Tough Test of Power

The Galion Iron Works & Mfg. Co. of Galion, Ohio, makers of the
Galion 10-ton Motor Roller, wrote us recently:

"As a test we put one of our first Master Rollers out on a scarifying job which lasted about two weeks. This is hard work for the engine, since the big pneumatic scarifier hooks deeply into the ground and tears it up very thoroughly. The work was on old water-bound macadam and it was done at a speed of about 1½ miles per hour. Gasoline used was from 6 to 7 quarts per hour with a quart of oil every 10 hours. The performance of the engine under this test was all that we could have wished. We are very well satisfied with the work this engine does in such a heavy piece of machinery as a 10-ton Roller. It will stop and reverse instantly on grades and seems to POSSESS ABUNDANT POWER FOR EVERY NEED."

You are always sure of your power if your machines are equipped with



CLIMAX

Trade
Mark
1773
Pat.
Off.

The "Trustworthy" Engine

**CLIMAX ENGINEERING CO., : 1 West 18th Ave.,
CLINTON, IOWA**

Also Builders of Climax Refrigerating Units

Eastern Branch: 30 E. 42nd St., New York,
N. Y.
Cleveland Branch: 657 Leader Bldg., Cleve-
land, Ohio
Chicago Branch: 2007 Harris Trust Bldg.,
Chicago, Ill.
Southeastern Branch: Chas. H. Adams,
Hotel Hampton, Atlanta, Ga.
Southwestern Branch: F. J. Dasey, Hotel
Wells, Tulsa, Okla.
Los Angeles, Calif.: Coast Machinery
Corp., 464-66 E. 3rd St.
San Francisco, Calif.: Coast Machinery
Corp., 829 Folsom St.
Birmingham, Ala.: Keiser-Geisner Engr.
Co., 1308-9 American Trust Bldg.
St. Louis, Mo.: Tulley Equipment Co., 616 Buder Bldg.

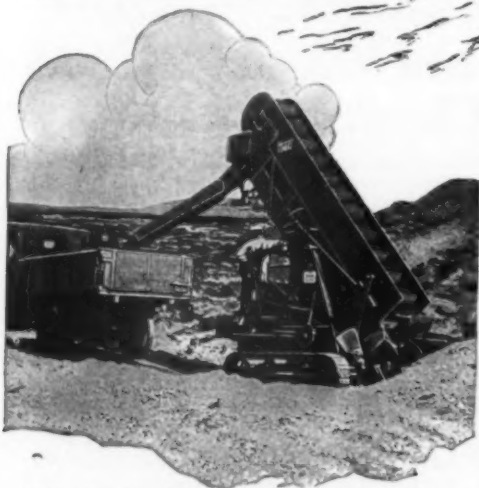
Boston, Mass.: Rapp-Huckins, 59 Haver-
hill St.
Dallas, Texas: Briggs-Weaver Machine
Co., 315 Market St.
Denver, Colo.: The Hendrie & Belthoff
Mfg. & Supply Co., 1621-39 17th St.
Jackson, Miss.: Anderson Sales & Dis-
tributing Co.
Jacksonville, Fla.: Construction Equip-
ment Co., 437 East Bay St.
Madison, Wis.: Wisconsin Machine &
Foundry Co.
Minneapolis, Minn.: Wm. H. Ziegler Co.,
619 Washington Ave. S.
Portland, Ore.: J. L. Latture Equipment
Co., 354 Belmont St.

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Getting Out Gravel for Road Repair

YOU can about double your truck fleet's day's work capacity—make 6 trucks do the work of 12—by putting the cost of 1 extra truck into a HAISS Creeper Loader.

The HAISS machine will put up a five yard load in $2\frac{1}{2}$ minutes—digging right from the bank. The quick get-away with a full load saves truck time that counts up in extra trips per day. On a short 2 mile haul you can get out two loads for every one you have been loading by hand. You get near-steam-shovel ability and



HaiSS Creeper Loader digging bank gravel from pit. Note that the broad creeper treads do away with the need of planking

loading capacity at half steam shovel cost.

The husky HAISS Creeper Loader with the power of its 37 H.P. Waukesha Motor and the digging ability of its patented Feeding Propellers and Slow Speed Crowding Drive (also an exclusive HAISS feature) will dig and load in a class by itself.

The Supt. of Roads for one of the Indiana Counties remarked to us at the last Road Show that on a mile haul he could have loaded bank gravel fast enough to keep 40 one-yard trucks going—if he could have had that many to use.

Let us send you Catalog 523 which will show you the machine and tell you what others have done with it. Write for a copy NOW.



142nd St. and Rider Ave., New York, N. Y.



Representatives Throughout the World. Millars Timber & Trading Co., London, British Representatives.
Cable Address: "Coalhoist" New York—"Western Union 5 Letter Edition" Code.

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Greater COMFORT in— GMC Big Brute

NEVER before has a driver had a cab like this. In just a moment he can enclose himself completely—without shutting off his view of the road or traffic, and without leaving his seat.

The bottom panel slides down, the upper panel up—opening the cab completely. Nothing is in the way of the driver when the cab is open.

An all Steel Fisher Cab

—which can be completely closed, or opened, in a moments time. A comfortable "coupe" for the driver. And that means increased efficiency.

Real Seats

—built with Marshall Cushion Springs, both seat and back completely upholstered in Spanish type Fabricoid. The seats are adjustable

One Piece Windshield

—clear vision type, with automatic windshield wiper. The driver can see where he is going, and what is coming, without straining his neck.

Complete Electric Lighting

—Magneto Ignition

—each independent of the other. Electric head



lamps, with both bright and dim connections, electric tail lamp, electric dash lamp, truck type generator and battery

Easier to Steer

The steering gear is a worm and split nut type—irreversible—with a big, corrugated steering wheel. It's as easy to steer Big Brute as to steer a small pleasure car. The tie rod is back of the axle—positively protected from damage through accident.

Products of Yellow Truck and Coach Manufacturing Company

subsidiary of General Motors
GMC Big Brute, 3½ and 5 ton trucks
GMC 1, 1½ and 2½ ton trucks Yellow Cabs
Yellow Coaches Yellow Light Delivery Trucks
Hertz Drive-Yourself Cars GMC 5 to 15 ton Tractors

A General Motors Product

Sold and Serviced Everywhere by Branches, Distributors and Dealers of

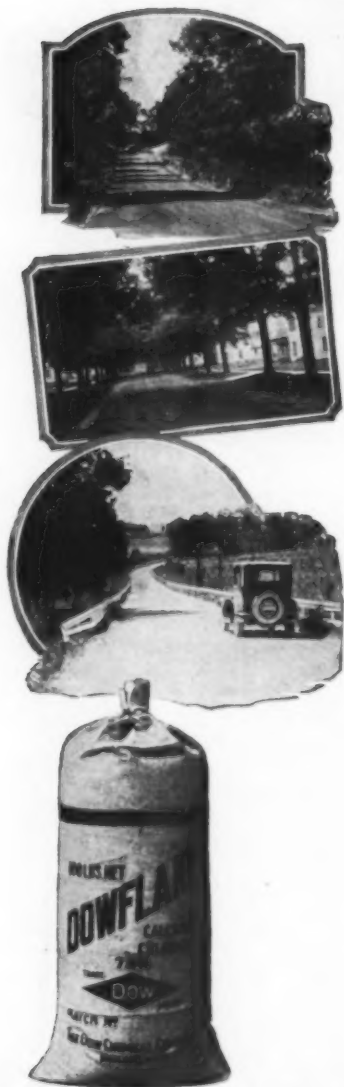
GENERAL MOTORS TRUCK COMPANY, PONTIAC, MICHIGAN

A DIVISION OF YELLOW TRUCK AND COACH MANUFACTURING COMPANY

© G. M. T. Co. 1926

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Which *is* Better? To Build New Roads



ROAD men know how quickly revolving wheels will pick a road to pieces and how fast the wind will carry the small particles away once the surface breaks through.

So maintenance has come to be as important as road building. A good road costs a lot of money to build. When the surface wastes away it not only wastes valuable material but wastes also the labor of putting it in place.

Dry Roads—even newly built, go to pieces quickly.

Dry gravel grinds up to powder—dust—and the dust blows away—every thin layer lost advances the day when a costly new road must be built.

Even on newly built roads much fine material is required to bind the larger particles to make them resist the pull of wear and wind. But in a dry, crumbly state these fine particles do not have sufficient binding power to hold the surface material in a compact mass.

Without moisture, loosely held material is soon thrown off into the ditch or blown away as dust. Soon traffic demands a new road or a costly resurfacing job.

Moisture binding with *Dowflake* avoids heavy new road and rebuilding costs.

*A Continuous Supply
of Moisture Will
Save Your Road.*

DOWFLAKE

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Or Keep Good Roads ~ in Condition with DOWFLAKE

IT'S so easy to maintain roads with Dowflake that few maintenance men have ever given up its use once they have seen what it saves in both labor and material.

Dowflake, absorbing several times its weight in moisture, holds the moisture continuously in the surface material for weeks. It thus solves a serious problem for the maintenance man who has often waited for a rain in order to put on the machine to condition the road. With Dowflake the grader can work any time. There's no need to stand idly by while a good road goes to pieces.

With Dowflake you can work the road—rain or no rain, shaping it up so that traffic can quickly pack fine material into a firm, resilient and moist protective cushion.

Moisture saves the road surface and thus saves the whole road structure.

Aside from the maintenance factor and the great saving in labor, road men also find that this method is a positive protection against the dust nuisance. The motorist and the roadside resident may not know so much about maintenance but they do recognize and openly approve the absence of dust on a road maintained with Dowflake.

Yes, it is better to keep roads in condition than to build them over. Dowflake supplies the necessary moisture to keep them in condition.

Write for our illustrated maintenance Manual "How To Maintain Roads".

THE DOW CHEMICAL CO., Midland, Mich.

Branch Sales Offices
90 West Street, New York City
Second and Madison Sts., Saint Louis.



The Dow Chemical Co.
Midland, Michigan

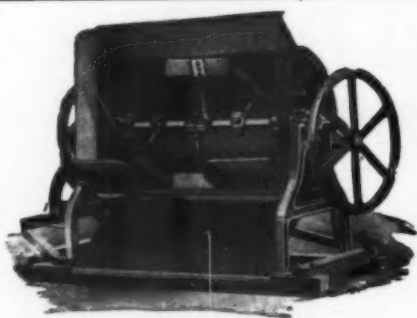
Please send me your book "How to Maintain Roads".

Name _____

Address _____

For Road Maintenance

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

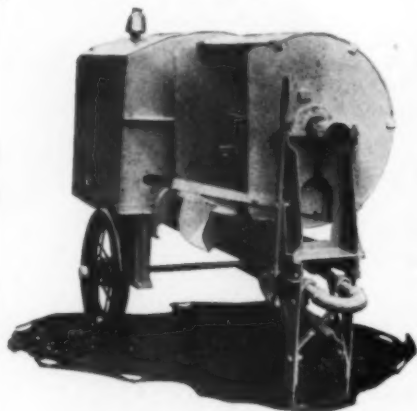


Mason or Plasterer

YOU need not let the price of mixing equipment stand in your way.

Either of these Blystone plaster or mortar mixers will pay for itself inside of a month. The original mixer with the patented reverse spiral shovel system guarantees a material saving with every shaft turn.

*Write Us Today
for Catalogue*



BLYSTONE MFG. COMPANY
526-C Street Cambridge Springs, Pa.

*Concrete Forms Furnished to
Specifications*

BLYSTONE



Grade Without Teams, Wagons or Trucks

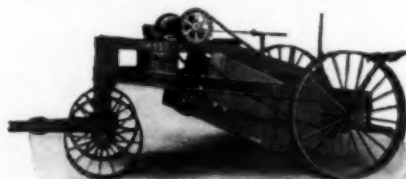
It is a simple matter to run a Baker Maney job. No teams, wagons or trucks to bother with—just two or three men and a train of automatic scrapers behind a tractor. The job runs along smoothly and the loads drop on the dump as regular as clock-work. That's automatic dirt moving.

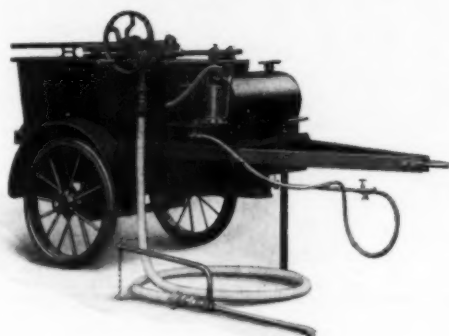
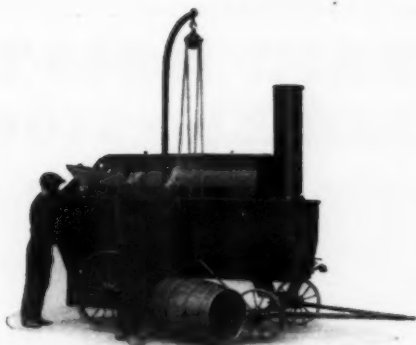
BAKER MANEY Self Loading Scrapers

The big powerful modern tractors do not bother these sturdy scrapers. They twist and turn like a snake, following the tractor anywhere without the least danger of breakage. They are made for the roughest kind of work, and just think!—two or three men operate a whole train at a labor cost of only 3 or 4 cents per yard!

They are made in two sizes—Model D, 1 1/4 Yd. and Model H, 3/4 Yd. Our big 32 page catalog tells all about them. Send for it.

THE BAKER MANUFACTURING CO.
585 Stanford Ave. Springfield, Ill.





If you could come behind the scenes and go through the Littleford shops and witness the care and forethought maintained from drafting room to foundry to assembly floors—you would have a better idea of the high quality of Littleford Tar and Asphalt Heaters. You would realize why they are more than simply kettles—why they heat more efficiently—why they last longer—require fewer repairs—why they fit the job so much better than ordinary kettles. For over twenty-five years Littleford Tar and Asphalt Heaters have been subjected to the use and abuse of the varying conditions that surround hot material operations. For twenty-five years their performance



has been closely checked—defects uncovered—improvements made.

The year 1926 finds Littleford heaters leading—in point of improved features—leading in point of performance—leading in point of preference because both contractors and maintenance officials find it just as important to buy the best heaters as it is to buy the best in anything else.—especially since the best cost no more in the beginning and cost less in the end.

Littleford Heaters are made in a variety of types and sizes. Our catalog shows them all and will be sent on request.

LITTLEFORD BROS.

455 East Pearl Street

CINCINNATI

OHIO



THEY ELIMINATE THE WASTE AND THE WAITS

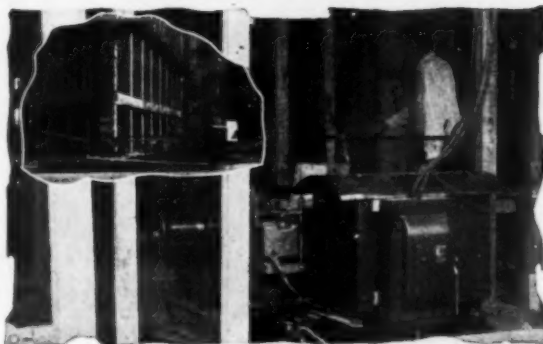
When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

NOVO ELECTRIC HOIST Runs Bucket and Elevator

TWO Novo Hoisting Outfits—a double drum LH Hoist with a Novo 18 HP. four cylinder gasoline engine, and a double drum DH Hoist with 50 HP. electric motor handled all material on a thirteen story hotel building job. The gasoline driven Novo hoist handled two automatic material skips and the electric driven Novo hoist operated material elevator and one-half yard concrete tower bucket.

Novo's recommended layout resulted in a considerable saving in the handling of material.

Let us help you on your hoisting problem.



NOVO ENGINE CO.
Clarence E. Bennett, Vice-Pres. & Gen. Mgr.
LANSING - MICHIGAN

**ENGINES
HOISTS
PUMPS**



**COMBINATION
OUTFITS**



1900-1926

for profitable Transport service

*F*or twenty-six years Mack interests have been centered upon the manufacture of Motor Freight Carrying Vehicles and Motor Buses.

Throughout the United States, Canada and in all foreign countries where representation has been established, experienced truck and bus buyers look upon MACK as an investment that not only has a twenty-six year background, but one produced by an or-

ganization whose manufacturing and selling policy has been consistent and whose plant expansion and earnings have kept a conservative balance. In short:—To those with experience a sound investment and a MACK are one.

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York City
One hundred direct MACK factory branches operate under the titles of: "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," "MACK MOTOR TRUCK COMPANY," and "MACK TRUCKS OF CANADA, LTD."



MACK TRUCKS • MACK BUSES • MACK FIRE APPARATUS • MACK RAIL CARS
P E R F O R M A N C E C O U N T S

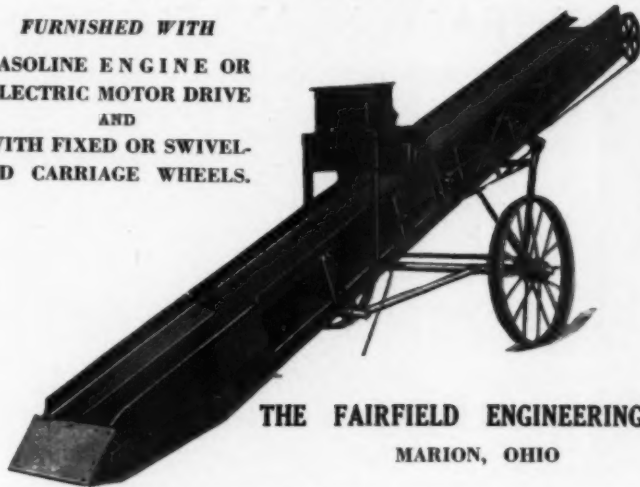
When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

FAIRFIELD PORTABLE BELT CONVEYORS

FOR HANDLING

SAND, GRAVEL, CRUSHED STONE, SLAG, CINDERS, ETC.

FURNISHED WITH
GASOLINE ENGINE OR
ELECTRIC MOTOR DRIVE
AND
WITH FIXED OR SWIVEL-
ED CARRIAGE WHEELS.



Write
for Descriptive
Folder No. 55K

THE FAIRFIELD ENGINEERING COMPANY
MARION, OHIO

Schaefer
CLEVELAND

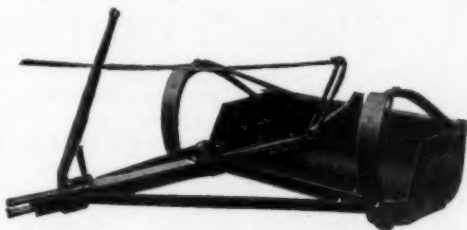
A ONE-MAN TOOL FOR EARTH-MOVING—

THE SCHAEFER AUTOMATIC TRACTOR SCRAPER

This simple, strong, earth-moving tool has been successfully used the world over since 1921 for laying-out allotments, parks, roads, cemeteries, golf courses, grading around new schools, excavating, etc.

Earth-loading, transporting, dumping or spreading—all are easily controlled from the driver's seat.

Send for Contractors' Circular



The
Gustav Schaefer
Wagon Co.

Vehicle Builders Since 1890
4180 LORAIN AVE.
CLEVELAND, O. U. S. A.

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

BATES MULTI-WALL PAPER BAGS

PROTECT CONTRACTORS AND BUILDERS

Against Loss of Cement

Due to Rough and Inclement Weather.



BATES MULTI-WALL PAPER BAGS

are made of five walls of tough, pliable waterproof paper and contractors and builders buying cement in these bags know it will not deteriorate if exposed to the weather.

Have your next order of cement shipped in Bates Multi-Wall paper bags.

Manufactured by

BATES VALVE BAG COMPANY

8200 SO. CHICAGO AVENUE

CHICAGO, ILL.



THAT EXTRA CAPACITY

of Humphries High Capacity Diaphragm Pumps means a saving of both time and money. Water is removed quicker, excavations are kept drier and delays are avoided.

Large direct waterways, non-clogging suction valves and outside guided discharge valves are but a few of the Humphries features. Write for detailed information.

There's a Humphries pump that will save you time and money.

THE HUMPHRIES MFG. CO.

MANSFIELD, OHIO

Distributors in Principal Cities



KIESLER

Clam Shell Buckets

Guaranteed to give satisfaction. Catalog on request.

Jos. F. Kiesler Company

936 W. Huron Street, Chicago, Ill.

WARRENITE-BITULITHIC

MEANS UP-TO-DATE Road and Street Construction

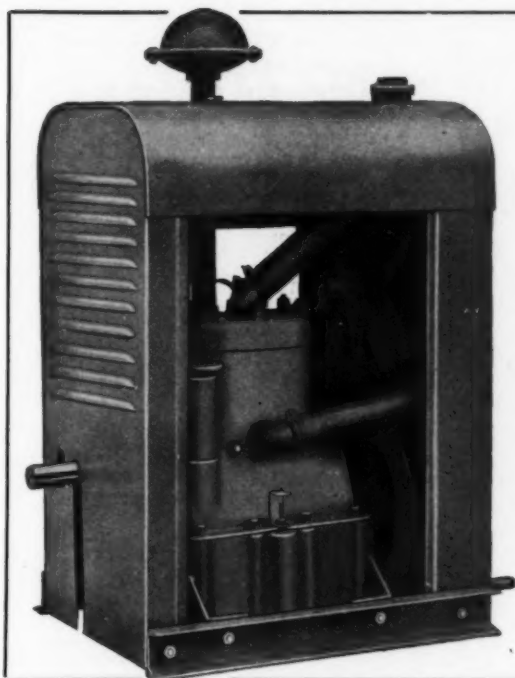
Write for illustrated booklet

WARREN BROTHERS COMPANY

Executive Offices: Boston, Mass.

DISTRICT OFFICES

New York, N. Y.	Chicago, Ill.	Oakland, Cal.
Los Angeles, Cal.	Portland, Ore.	Phoenix, Ariz.
Charlotte, N. C.	Memphis, Tenn.	St. Louis, Mo.
Toronto, Ont.	Minneapolis, Minn.	Utica, N. Y.
Winnipeg, Man.	Vancouver, B. C.	Washington, D. C.
New Orleans, La.	Harrisburg, Pa.	Dallas, Tex.
Salt Lake City, Utah	Birmingham, Ala.	



**USE
ALAMO ENGINES
ON
YOUR EQUIPMENT**

Alamo Engines develop their full rated Horse Power, and 10 per cent overload.

Any equipment manufacturer will be glad to furnish you an Alamo Driven Outfit.

Write for folder

THE ALAMO ENGINE CO.
HILLSDALE MICH., U. S. A.

Builders of

Vertical and Horizontal Engines, in sizes from 1½ to 15 H.P., inclusive.

**All
Good Roads
Come Out of
Dump Trucks**

WOOD HYDRAULIC HOIST & BODY CO.
World's Largest Builder of Hydraulic Hoists and Steel Dump Bodies

7938 RIOPELLE STREET DETROIT, MICH.

A Hoist for every make, model and capacity of truck. With ample power to raise any load. Wood Hoists are the Recognized Standard of the World.

**The QUICKTRIP Line
ALL-STEEL DUMP BODIES for
FORD ONE-TON TRUCKS**



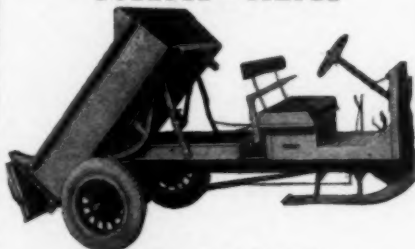
Quality all through
Use also with closed cabs
Insures continued service
Cuts hauling costs
Keeps truck on the job
Three seconds to operate
Rigid construction
In every way a better body
PRICED RIGHT.

New York Central Iron Works Co., Inc.
HAGERSTOWN, MARYLAND

Write or wire us for full information
and name of our nearest distributor.

**WHY NOT
ELIMINATE GRIEF?
use ANTHONY BODIES and
FORGET YOUR TROUBLES**

DURABLE — SIMPLE



QUICK — POSITIVE

**NO CASTINGS TO BREAK
NO TIE-UPS FOR REPAIRS
ONCE USED—ALWAYS USED**
Count the Trade-Marks on the Road

ANTHONY COMPANY

STREATOR, ILLINOIS



**SPEARWELL
BIG 8 GRADER
MAINTAINER
Leads Them All.**

30 to 35 Miles
of Maintenance
an average
day's work at
a total cost of
from

**\$10.00
to
\$12.00**



A Complete,
Standard 8-ft.
Grader Unit
with all
standard con-
trols operated
from driver's
platform in
rear.

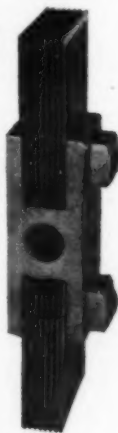
Write for descriptive literature and prices.
SPEARS-WELLS MACHINERY CO., INC.
Manufacturers SPEARWELL Equipment
OAKLAND CALIFORNIA

HAND BUSH HAMMERS

*A size for every bushing
and dressing job on
concrete.*

We would like to acquaint
you with the most com-
plete line of Pneumatic
tools and chisel equipment
for bushing concrete and
finishing cast stone.

Hand Points and Chisels.
Hand and Striking Hammers.
Drill bits and Hollow Steels.

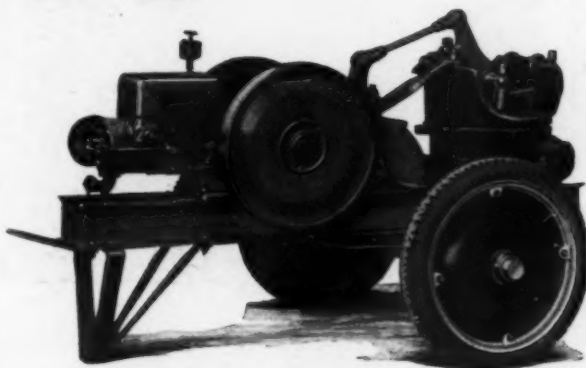


Descriptive matter awaits your call

THE DALLETT CO.
PHILADELPHIA
NEW YORK CHICAGO

The **LAUSON**

"TRAILER" Diaphragm Pumping Unit



Jack Enclosed Gears Running in Oil

Our specially designed Jack is driven by gears direct from engine crankshaft. Bearings are high grade bronze. Gear is located inside belt pulley, leaving Pulley free for other work.

Powered by the "Lauson" engine—recognized for highest quality construction.

Cushion Tires are standard, their preference by contractors indicating superior serviceability over Pneumatics in this field of use.

Complete production of engine, jack and trailer in our own factory delivers these outfits at a remarkably attractive figure.

Two Sizes:
with 2-H.P. Engine for 3-in. Pump and with 2½-H.P. Engine for 4-in. Pump. Delivered Complete Including Pump—or may be ordered without pump, all necessary parts to receive leading makes of pumps being provided on the outfit. Also furnished on four steel wheels.

We also Manufacture:
Gasoline Engines, Pump Jacks, Light Plants, Concrete Mixers, Farm and Road Tractors.

Write for Literature and Prices

THE JOHN LAUSON MFG. CO.

**11 JACKSON STREET,
NEW HOLSTEIN WIS.**

Save Money for the Builder with the ZETTERLUND AUTOMATIC HOIST

Easy to erect — saves time and energy — economical.

The Zetterlund Automatic Hoist saves the wages of an operator. Wheelers operate the hoist from the discharge level, operating the control lever just as easily and simply as signaling an operator. Hoist stops automatically at the floor level.

It can be extended to any height, and is guaranteed to give efficient service at 125-foot levels. Maximum load, 1,200 pounds—lifting speed, 175 feet per minute. The Zetterlund Automatic Hoist is efficiently propelled with a Le Roi engine.

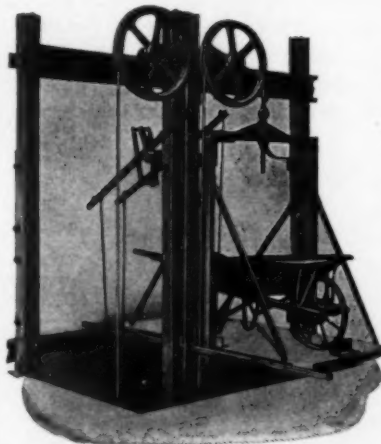
It saves fuel, through an automatic gas control. Engine runs slowly until you are ready to lift. Acceleration continues until discharge level is reached, when it stops automatically. Guide posts can be used over and over again, as no nails are used in erection.

Parts can be quickly, simply and economically replaced. No brakes to wear out. No chance for the clutch to slip.

Safety dogs prevent danger from load dropping. Just as easy, simple, and safe to take a load down as to take it up.

Roller bearings reduce transmission losses to a minimum. They guarantee longer life to the Hoist. All pieces receiving hard wear are carbonized and hardened.

Mounted on casters, it is easily and economically moved.



The above view shows arrangement at discharge level.

**Manufactured by
Zetterlund Hoist & Machine Co.
128-132 Ferry Street Milwaukee, Wis.
Excellent Distributor Territory Open**

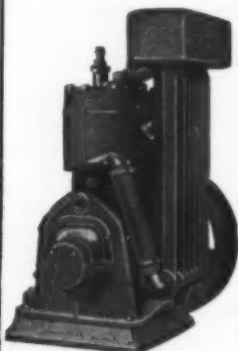
Low Cost Air Makes Contracts Profitable

Contractors find the Curtis Fordson Combined Unit invaluable with pneumatic tools for such work as:

*Paving breaking,
Trenching hard pan,
Backfill tamping,
Rock drilling,
Breaking boulders,
Riveting,
Caulking iron pipe,
and similar work.*

It is the broad range of application of the Curtis Portable in connection with the Fordson that makes the Curtis-Fordson Unit invaluable to the average contractor.

Many find that this outfit keeps their bids low, thus enabling them to get profitable contracts. It will do this for you as well. The coupon below will bring full information. Fill it out and mail it to us today.



Standard Curtis Compressor with cooling system assembly as used on Portable Outfit.



Invaluable for Public Service Work

Among its many other uses, the Curtis Fordson Portable Compressor Unit will be found invaluable on such jobs as paving breaking and back-fill tamping. Where speed is essential, this unit saves a vast amount of time.

This saving of time becomes immediately apparent when you consider the tremendous difference in the amount of work two men with pneumatic tools can do as compared with two men with hand tools. Add to this the fact that the Fordson moves the Curtis right along with the job and you eliminate the time lost with most portables through the necessity of taking men from their work to push the compressor into action.

One of the tool runners can drive the Fordson and regulate the Compressor. It is never necessary to take the men from their work to push the Compressor around.

Bulletin C-4-B is full of real "meat" about the Curtis Portable. It will be mailed to you upon receipt of the coupon below.

Curtis Pneumatic Machinery Company, St. Louis, Mo.

1854-Seventy-two years-1926

CURTIS Pneumatic Machinery Co.
1931 Kienlen Ave., ST. LOUIS, MO.
518-I Hudson Terminal, New York City

Please send me without obligation your free bulletin C-4-B.

NAME

ADDRESS

CITY..... STATE.....

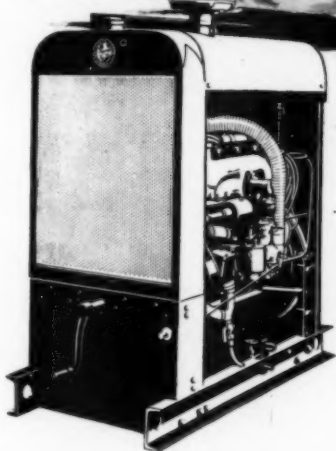
Have you a Fordson?

What kind of work do you do?

CURTIS

Portable Compressor for FORDSON

Dependable Power  for Every Purpose



Specify Continental for dependable industrial power.

Power for Profitable Production

Continuous performance of both men and machinery calls for a dependable power plant to keep the wheels turning.

Continental Motors are built by master motor builders and render positive and continuous service under all conditions and over long periods of time.

They are used for a score of diversified industrial uses for all of which Continental provides specific types of motors.

Specify Continental.

CONTINENTAL MOTORS CORPORATION

Offices: Detroit, Mich., U. S. A.

Factories: Detroit and Muskegon

The Largest Exclusive Motor Manufacturer in the World

Continental Motors

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Upon Lansing Products
The Sun Never Sets.

Send for
Your
Copy

FOR many years the Lansing-Company has enjoyed world wide distribution. Not only has the Lansing-Company seven large warehouses in the United States with repair stocks at many other points, but they have the same unequalled distribution in other countries. This, with the manufacturing of 517 different articles, insures a constant demand for Lansing products. This enables the Lansing-Company to buy materials in great quantities and keep up a steady production, which lowers the cost of their quality products to the purchaser. The retaining of old customers and the adding of new is the splendid testimonial to Lansing-Company's enviable leadership in their fields of endeavor.

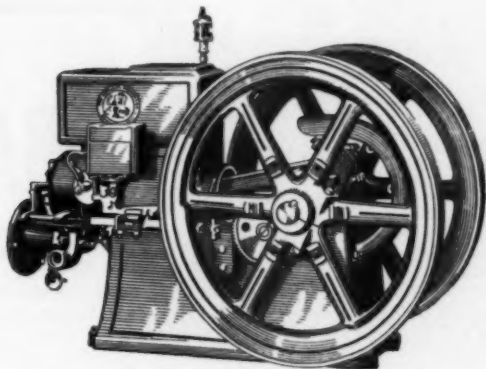
LANSING COMPANY, LANSING, MICHIGAN

BRANCHES

Chicago Minneapolis Boston San Francisco New York Kansas City Philadelphia

LANSING

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.



—it's *always* on the job!

Dependability is the essence of successful engine operation. Dependability is a pronounced virtue of Hercules engines.

Fair weather or foul, regular hours or overtime, standard work or excess load—the Hercules is always on the job.

The powerful spark from the Wico magneto starts the engine immediately. No pre-warming is neces-

sary. There is no waiting, no loss of men's time.

Such dependability means more work accomplished, and at less cost. It is available to you in concrete mixers, wood-working and road-making machinery and other types of industrial equipment.

Always buy the products equipped with Hercules engines. A letter to us will bring you the names of those progressive manufacturers whose machinery is always on the job.

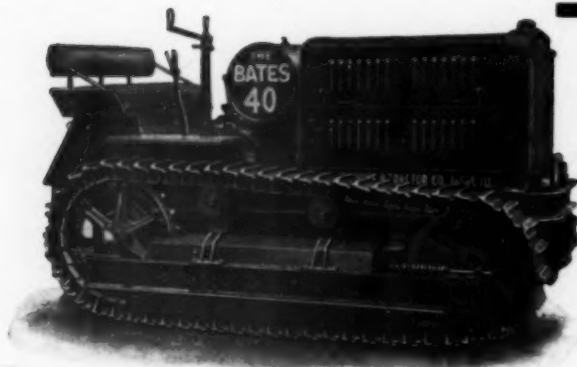
THE HERCULES CORPORATION, EVANSVILLE, IND., U.S.A.

Established 1894

HERCULES ENGINES



When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.



BATES

ROAD TRACTORS

LOWEST OPERATING COSTS

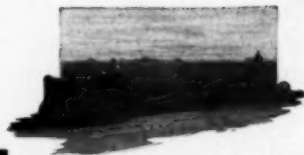
Bates Road Tractors are built by one of the oldest and most experienced Crawler Type Tractor manufacturers in the United States.

The low operating costs are due to features built into the tractors step by step from the results of thousands of crawler tractors operating all over the world.

Write for New Catalog

Bates Manufacturing Company

JOLIET, ILLINOIS, U. S. A.



ACME TRI-UTILITY ROAD BUILDER

Grader, Roller and Scarifier all with one power plant. Saves cost of two Fordsons. Write for Particulars.

AS GRADER AS ROLLER AS SCARIFIER

ACME ROAD MACHY CO. FRANKFORT, N.Y.

VULCAN

GASOLINE LOCOMOTIVES

FOUR SPEED WORM GEAR DRIVE

VULCAN IRON WORKS

WILKES-BARRE PENNA.

THE EFFICIENT

PIONEER BACK DUMP BUCKET

is a great money-saver for progressive contractors.

PIONEER BUCKET COMPANY

Successors to
MANSFIELD ENGINEERING CO.
Fletcher Savings & Trust Bldg., Indianapolis, Ind.

You Buy

STRENGTH - SERVICE - SAFETY

when you purchase

ANVIL BRAND BLOCKS

For

MANILA OR WIRE ROPE.

We make all standard styles and sizes and can also supply any special blocks, if you will furnish specifications.

WESTERN BLOCK CO.

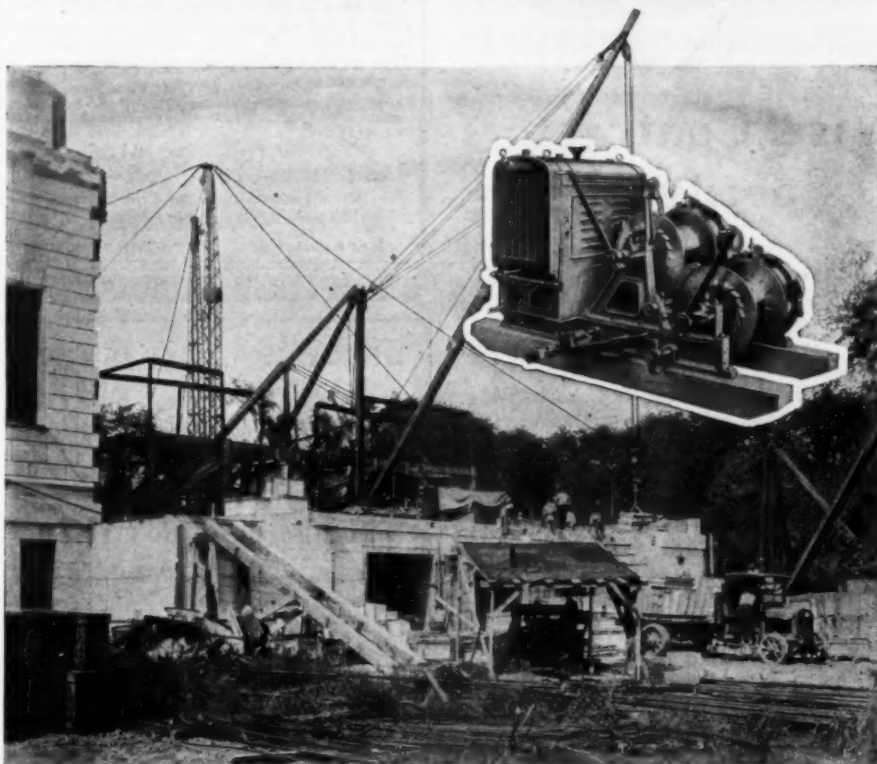
Lockport, N. Y.

New York City Chicago

CLYDE

Standard Hoists and Derricks
For the General Contractor
STEAM · ELECTRIC · GASOLINE · BELT

The New Detroit Institute of Arts is shown below in process of construction. To avoid chipping, all stone are raised by the hoists and lowered slowly into place by the drum brakes. Marble columns for the building weigh 15,200 lbs. each. All material including the columns was handled with two Clyde gasoline hoists like insert shown.



CLYDE IRON WORKS SALES COMPANY

Sole Distributors for CLYDE IRON WORKS, Duluth, U. S. A.

Stocks Carried in the Following Warehouses:

NEW ORLEANS
309 Magazine St.

NEW YORK CITY
E. 136 St. and Locust Ave.

PORTLAND, ORE.
555 Thurman St.

SEATTLE
3410 First Ave. So.

Branch Offices:

CHICAGO
11 So. La Salle St.

CINCINNATI
1913 Union Cent. Bldg.

MEMPHIS
69 Union Ave.

JACKSONVILLE
43-45 W. Forsyth St.

SAN FRANCISCO
737 Monadnock Bldg.

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you,



Heil Model 11 Steel Dump Body fitted with swinging partitions and mounted with a No. 5 Heil Hoist on a 3 1/2-ton truck

Wise Contractors Specify Heil

IF you are looking for correct design and thorough construction in your motor truck dumping equipment, you will find what you want in HEIL steel bodies and hoists. The dump job shown above is especially adapted for "batch" hauling. The tail gate is fitted with a chain device for spreading the load. Note the clips on the body to take additional sides.

A Heil Hoist is responsible for the big dumping angle shown above. New improvements have made the Heil Hoist still more efficient and powerful. Find out more about Heil Hoists and how you can save money by using them.

Send for the Heil Catalog and Price List. Ask us to describe the latest Heil Body and Hoist Models for 1926. Bulletin 150 describes the Heil Ford equipment line.

THE HEIL CO.

1243 26th Ave., Milwaukee, Wisconsin

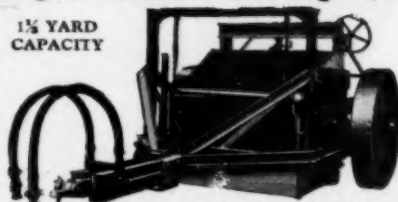
Twenty-Five
Heil
Distributors



Factory Branches
Chicago
Philadelphia

LA PLANT-CHOATE Hydraulic Scrapers

1 1/2 YARD
CAPACITY



Operated in trains of four, these highly improved and efficient Scrapers have demonstrated their ability to move from 400 to 700 yards of dirt per day—and move it economically.

LaPlant-Choate Hydraulic Scrapers embody numerous exclusive advantages which can be made to contribute to your profit!

Write For Catalog M On
Tractor-Scrapers—Dump-Wagons—Bulldozers
Distributors in all Principal Cities
LaPlant-Choate Mfg. Co.

3515 First Avenue CEDAR RAPIDS, IOWA

UNIVERSAL HOISTING MACHINERY CORP.

420 Sycamore St., BUFFALO, N. Y.

**DERRICKS, STEEL OR WOOD; WIRE
ROPE SHEAVES AND BLOCKS;
WINCHES, HAND AND ELECTRIC**

*Let us show you our real design of Derrick
Fittings Backed by an Unusual Guarantee*

Buhl

A variety of types and sizes to meet every portable compressor demand—Sold through reliable dealers and distributors.



Send for bulletins today

**The Buhl Company
MANUFACTURERS**

General Office:
405 S DEARBORN ST.
CHICAGO

BUHL type "V" furnished in 115 and 180 ft. displacement

The **G-Boy**

GRAHAM BROTHERS *New ONE TON TRUCK*

Graham Brothers latest and most impressive achievement—the G-BOY!

A one ton truck embodying entirely new ideas in design and balance and selling at an astonishing price.

Extraordinary purchasing power and vast production made the G-BOY possible.

Largest exclusive truck manufacturers in the world, Graham Brothers buy and build in enormous volume.

The price and quality of the G-BOY illustrate the extent to which buyers benefit by this volume and its resultant economies.

The G-BOY is the most important contribution in years to the cause of

Better Transportation at Lower Cost.

A new system of weight distribution effects a revolutionary improvement in balance.

The compact wheelbase facilitates ease of handling and yet affords unusually generous body capacity. The truck is gracefully low, with steel spoke wheels and 30 x 5 truck type cord tires.

Dodge Brothers engine is the standard power unit, with a new heavy transmission that has proved its quality in greater capacity types.

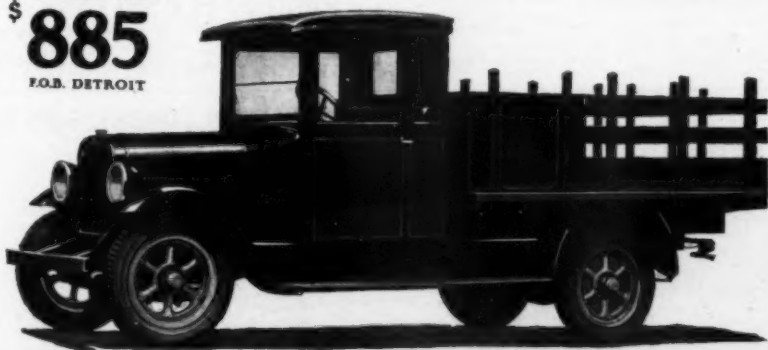
The entire truck, in fact, is built to out-live and out-perform trucks costing hundreds of dollars more.

Bodies for the G-Boy—and for Graham Brothers complete line of Trucks and Motor Coaches—are built in Graham Brothers own factory at Evansville, Ind.—the most modern plant of its kind in America. Whatever your requirements may be, a suitable body is immediately available at an attractive price.

GRAHAM BROTHERS

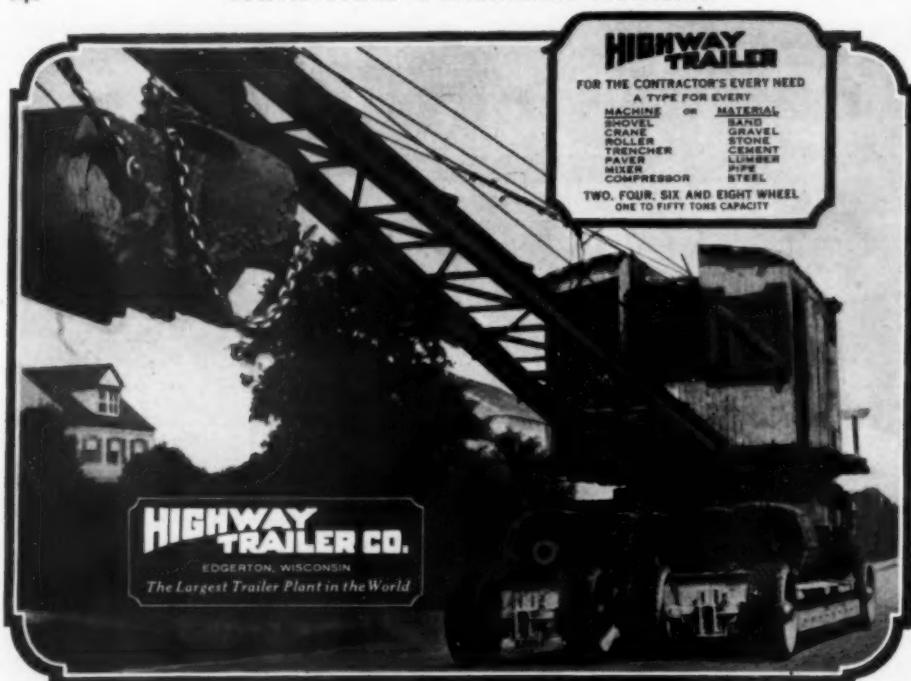
Evansville — DETROIT — STOCKTON
A DIVISION OF DODGE BROTHERS, INC.
GRAHAM BROTHERS (CANADA) LIMITED—TORONTO, ONTARIO

CHASSIS
\$ **885**
F.O.B. DETROIT



SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you,

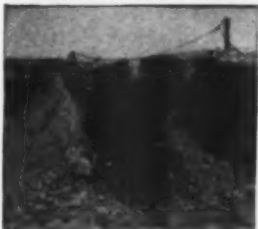


HIGHWAY TRAILER
FOR THE CONTRACTOR'S EVERY NEED
A TYPE FOR EVERY
MACHINE OR MATERIAL
SHOVEL SAND
CRANE GRAVEL
ROLLER STONE
TRENCHER CEMENT
PAVER LUMBER
MISER PIPE
COMPRESSOR STEEL

TWO, FOUR, SIX AND EIGHT WHEEL
ONE TO FIFTY TONS CAPACITY

HIGHWAY TRAILER CO.
EDGERTON, WISCONSIN
The Largest Trailer Plant in the World

THE CRESCENT POWER DRAG SCRAPER DOES THE WORK TEAM SCRAPERS CAN'T



In wet sticky ground and under - water digging, a Crescent Power Scraper digs fast, efficiently and at a low cost. One man operating a "Crescent" can move from 100 to 4000 cu. yd. per day, the yardage handled depending upon the length

of haul and size of scraper used.
Write for Pamphlet No. 24.

SAUERMAN BROS., Inc.

404 S. Clinton St., Chicago



Literature on Request.

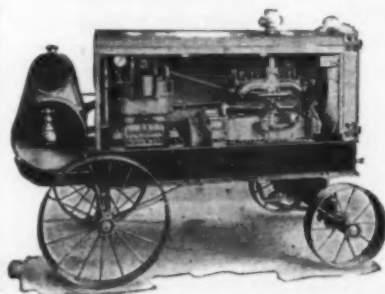
Clean Sewers

Miller Siphons prevent sewers clogging from accumulated refuse. They regularly flush out the filth. No moving parts. Our complete descriptive text books give all details.

PACIFIC FLUSH-TANK CO.

Singer Bldg.
NEW YORK CITY

4241 Ravenswood Av.
CHICAGO, ILL.



O.K. PORTABLE AIR COMPRESSORS O.K.

SUMMARY OF ADVANTAGES:

Large capacity. Special carburetor control, saving your gas by idling the motor when not supplying air. CLUTCH FOR EASY WINTER STARTING. Rigid, compact, standard-make engine. Pump lubrication. Visible oil gauge and ignition switch. Ease of adjustment or repair. Reasonable price.

Write for catalog.

O. K. COMPRESSORS

118, 160, 265 cu. ft. piston displacement; Steel Wheels, Rubber Tires, Spring Mounting.

O. K. Gasoline Hoists, 4-165 H.P.
O. K. Electric Hoists, 5-150 H.P.

O. K. CLUTCH & MACHINERY CO.

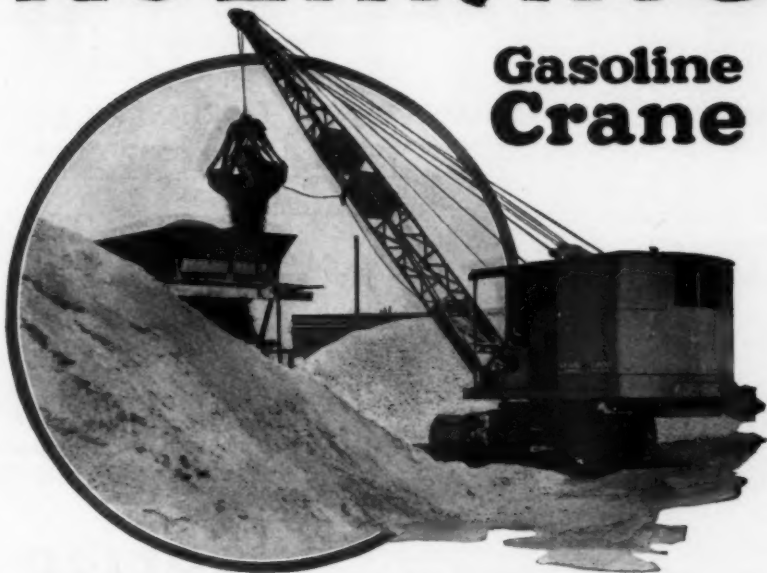
COLUMBIA

PENNA.

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you,

KOEHRING

Gasoline Crane



Problems of field adjustment or replacement made easy by Koehring design.

NO old prejudices to be observed! No old steam features to be preserved! The Koehring is strictly designed for internal combustion engine from multiplane to boom tip, and represents *simplicity in design and staunch — unusually staunch — construction.*

To the greatest possibility, Koehring Heavy Duty Construction forestalls replacements and adjustments in the field, but when necessary, its simplicity of construction, accessibility and interchangeability of parts make the work easy. Koehring finger-tip ease of control and smooth ease of operation mean extra yardage on every job.

Crane Capacities

No. 1—1 cu. yd. clamshell bucket on 40 ft. boom or $\frac{1}{4}$ cu. yd. on 45 ft. boom. Lifting capacity, 10 tons at 12 ft. radius. 4 cylinder, 5x6 in. gasoline engine, 1100 R. P. M.

No. 2— $1\frac{1}{4}$ cu. yd. clamshell bucket on 45 ft. boom or 1 cu. yd. on 50 ft. boom. Lifting capacity, 15 tons at 12 ft. radius. 4 cylinder, 6 x 7 in. gasoline engine, 925 R. P. M.

Know the Koehring. Send for Crane Bulletin No. Cr. -6



KOEHRING COMPANY MILWAUKEE WISCONSIN
PAVERS, MIXERS—GASOLINE SHOVELS, CRANES AND DRAGLINES

Sales Offices and Service Warehouses in all principal cities

Foreign Department, Room 1370, 50 Church St., New York City.

Canada, Koehring Company of Canada, Limited, 105 Front Street, East, Toronto, Ontario.

Mexico, F. S. Lapum, Cinco De Mayo 21, Mexico, D. F. A-3203-111



**—NATIONAL—
Concrete Block Machines**

Anticipate the demands of the industry.

Thoroughly developed

Satisfactory Equipment

Well built

Ask where you can see one.

CEMENT BLOCK MACHINERY CO.

50-58 Columbia St.

Newark, N. J.



SPEED UP!

Time saved is money earned, especially in the contracting field. How much do you lose in a day by using ordinary scrapers? Stop this profit leak! Learn more about Euclid Scrapers. Fast, efficient, economical—they assure the greatest day's work at the lowest cost.

Euclid Scrapers are extremely simple and fast operating. The tractor keeps moving all the time. An easy pull on the clutch rope raises the full pan, to carrying position. Another easy pull dumps the load over backwards permitting the load to be dumped in a pile, distributed, or dumped over an embankment.

Write us today for literature

THE EUCLID CRANE & HOIST CO.
108 CHARDON RD. EUCLID, OHIO

Offices in all principal cities



Some of the world's greatest records of yardage production on earth and stone moving projects have been made with

Marion
Power Shovels
Electric—Steam—Gasoline—Electric

Marion Power Shovels have a world-wide reputation for low-cost yardage. They are famed for digging. Built in both revolving and railroad types, in capacities ranging from $\frac{1}{4}$ -yd. to 8-yd., and with choice of powers and tractions. Come to Shovel Headquarters

THE MARION STEAM SHOVEL CO.

Established 1884
MARION, OHIO

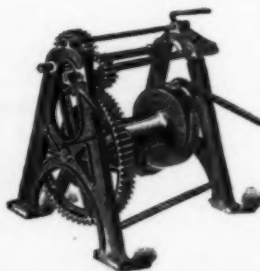


**DOBBIE
Derricks and Winches**

**Complete Stock of Fittings and
Winches on hand at all times.**

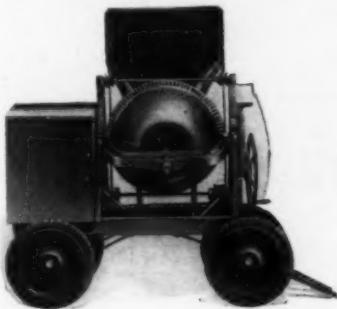
Write for our complete Catalog No. 22.

Dobbie Foundry & Machine Company
Niagara Falls, N. Y.



When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

MASTER MIXER



Gives More For The Money

It's only natural that the Kiel Master mixer should do more work than any other mixer because it is better built.

Counter Drive Shaft Bearings—Dust proof. Timken Roller Bearings running in oil. Length of bearing 6 inches.

Drum Spindle Bearing 10 inches long. Ball thrust bearing and phosphor bronze bearings—dust and water proof.

Positive Gear Drive Inclosed in engine cab. No chains to stretch or replace. Drive shaft carried on Timken Roller Bearings.

Balanced Drum and Yoke Large Hand wheel makes easy tilting.

Special Mixing Blades insures fast mixing and quick, clean discharge.

Timken Roller Bearing Wheels with dust proof hub caps and Cushion Tires insures greatest portability.

Plenty of Power—2 1/2 H.P. Engine with Wico high tension ignition.

Large Capacity—over actual rating. Drum size 31 x 28 in. with 18-in. opening. Holds 5 1/4 Cu. Ft. of loose aggregate without slopping.

Compare the above construction, then write us for prices.

KIEL MACHINE COMPANY
KIEL, WIS.



—the Logical Choice for All Road Work

WHERE economy is a prime consideration, there you will find CLETRAC the outstanding favorite. Among State Highway Departments and road contractors everywhere these powerful, easily handled power units are building up amazing records of low-cost performance.

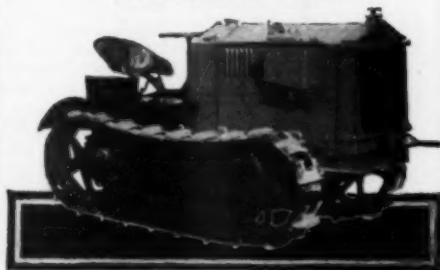
After exhaustive tests during the last two months the highway departments of three great states placed their orders for batteries of CLETRACS. Over and over again CLETRACS have proved their ability to do road construction and road maintenance work at a real saving.

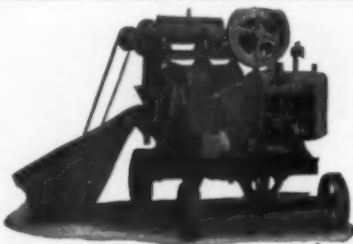
"Snap" Lubrication—Sure Traction— 90 Per Cent Power Efficiency

The powerful CLETRAC "K" is the only tractor made with the instantaneous oiling system. A push of a plunger and the "Snap" Lubricator thoroughly oils the lower track wheels without stopping the machine. CLETRAC "K" pulls practically its own weight, delivering 90 per cent power efficiency. And no other tractor made can equal that performance.

Let us show you the proof. Let us tell you all the details of this better tractor. Write today for our folder, "Cletrac K for All Road Work."

The Cleveland Tractor Co.
Cleveland, Ohio





Atlas YARDAGE

120 to 150 Cu. Yds. in 10 hours with an Atlas one bag Mixer.

Atlas Mixers are of sturdy dependable construction, and the 7-S is regularly equipped with multiple cylinder LeRoi Engine, giving excess power.

We build $3\frac{1}{2}$ ft., $\frac{1}{2}$ bag, 1 bag and 2 bag Mixers.

Dealers write for agency proposition.

ATLAS ENGINEERING COMPANY

3036 GALENA STREET,

MILWAUKEE, WIS.



Pennsylvania Cement

∴ QUALITY ∴ SERVICE ∴

PENNSYLVANIA CEMENT CO.

New York I. & Boston

Philadelphia

Buffalo



ALUMINUM RULES

IN 10ths and 100ths OF FEET.

SOMETHING NEW

FOR CIVIL ENGINEERS, SURVEYORS, HIGH-WAY BUILDERS, TILE LAYERS, AND OTHERS



Accurate, Light Weight, Durable, Rust Proof.

FURNISHED WITH OR WITHOUT FOLDING END HOOK.

THE LUFKIN RULE CO.

SAGINAW, MICHIGAN
NEW YORK WINDSOR, CAN.

BUCKETS



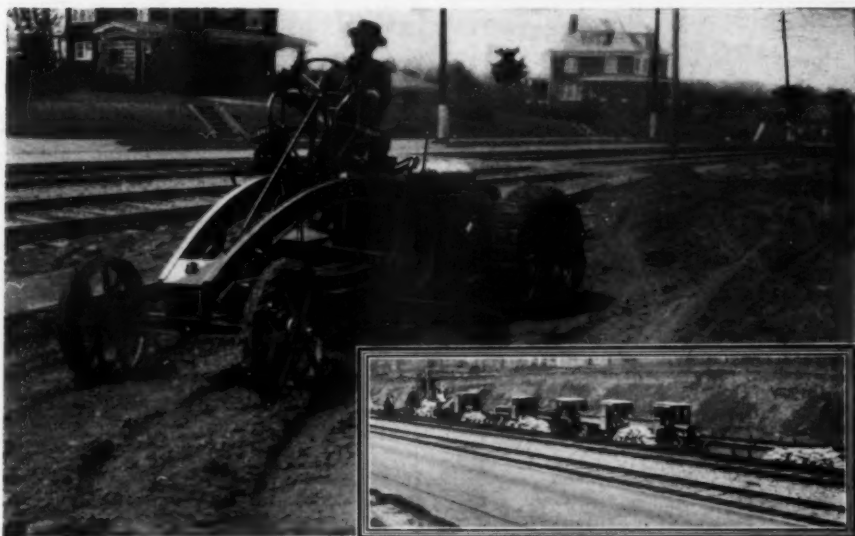
Write us for information on Turn-Over and Bottom Dumping Buckets of all sizes; Steel Skips, Flat, End and Bottom Discharge Cars; Push Carts, Asphalt Heaters and Lead-Melting Furnaces; Sheet Steel Pipes, Smoke Stacks, Concrete Chutes, etc.

*Clam-shell and Dumping
Bucket repairing a specialty.*

G. L. STUEBNER IRON WORKS

INCORPORATED
45th AVE. & VERNON BLVD., L. I. CITY, N. Y.





Saves the Labor of 12 Men and 2 Teams

"In the first three months, our Fordson tractor paid for itself."

That is the statement made by Walter Huber, of Shaw & Huber, Contractors, at Eaton, Ohio.

"With the Fordson grader we can get in between the forms and do our work without turning around, which is of great advantage. This Fordson has saved the labor of 12 men and 2 teams on grading work. We believe it one of the best pieces of equipment we have ever seen for contractors in road construction.

"A fleet of 30 Ford ton trucks hauls materials to the concrete mixer. They are better than heavier units, because they do not cut up the subgrade and are faster on the road. These trucks make ten trips in ten hours, hauling sand and gravel a distance of 8 miles. We prefer Ford equipment for its sheer dependability."

Such is the opinion of contractors who know the value of performance and the obvious economy of Fordson tractors and Ford trucks.

Fordson
Tractor

\$495

f. o. b. Detroit

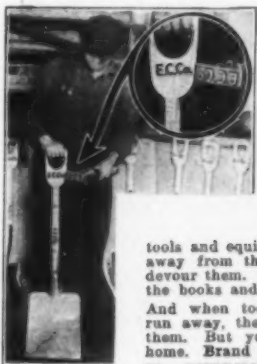
Ford Motor Company
Detroit, Michigan

CARS

TRUCKS

TRACTORS

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you,



THESE TOOLS ARE NOT ORPHANS

Tools and equipment, like children and dogs, wander away. Children and dogs come back, but

tools and equipment don't. Once away from the fold, the wolves devour them. You write them off the books and buy more.

And when tools and equipment run away, they take Profit with them. But you can keep them home. Brand them.

The EVERHOT Branding Torch permanently marks your tools and your equipment.

No more orphans of the storm. Tools branded the EVERHOT Way are safe from the hands of pilferers.

Brands or solders continuously. Burns gasoline.

*Write for low prices
and descriptive circular.*

EVERHOT
America's Brand Makers
EVERHOT
MANUFACTURING CO. MAYWOOD, ILLINOIS

FOR HANDLING CRUSHED STONE or SAND and GRAVEL



From cars to trucks the RELIANCE PORTABLE CAR UNLOADER will save more than its cost in one season.

Catalog and Price List on Request.

UNIVERSAL ROAD MACHINERY CO.
KINGSTON, N. Y.

New York Office, 114 Liberty St.

Boston Office, 141 Milk St.

REAL SOURCE OF PROFIT

An undeniable source of profit for road contractors is found in the use of the

BURCH SPREADERS'

Users tell us it pays for itself in a mile, and it certainly spreads road material more evenly and far more economically.

Burch Unloaders, for car use or of the portable variety, are two other great money makers.

Write us about these.

The Burch Plow Works Co.
Dept. MA Crestline, Ohio



Jackson M-3 and M-7 Concrete or Mortar Barrows



Two of the most popular types of barrows used by Contractors and Builders. Special square front deep pressed trays with wired edges—No seams.

*Ask for Catalog 12-C
(Beautifully illustrated)*

JACKSON MANUFACTURING CO.
Manufacturers of

Barrows, Concrete Carts, Drag
Scrapers and Mortar Pans

HARRISBURG, PA.

The Ford Standard of Performance Applied to Every Job

Ask the Ford Dealer or the Distributor nearest you about Warford equipment

Albany, N.Y. - Foster-Warford Company
 Atlanta, Ga. - Atlanta-Houdaille Company
 Auburn, N.Y. - Foster-Warford Company
 Buffalo, N.Y. - Foster-Warford Company
 Canton, Ohio - Dine-DeWiss Company
 Charlotte, N.C. - Hall-Warford Company
 Chicago, Ill. - Sieg-Warford Company
 Columbia, S.C. - Warford Sales Co. of S.C.
 Dallas, Texas - Houdaille-Polk Company
 Davenport, Iowa - The Sieg Company
 Denver, Colorado - Motor Specialties Co.
 Detroit, Mich. - Transmission Sales Co.
 Haverhill, Mass. - Massachusetts Warford Co.
 Idaho Falls, Idaho - Auto Parts Company
 Indianapolis, Ind. - Kenney Equipment Co.
 Kansas City, Mo. - Warford Western Co.
 Lewiston, Me. - Wade & Dunton Motors, Inc.
 Los Angeles, Cal. - Hammel-Gerke Co.
 Nashville, Tenn. - W. C. Nabers
 Memphis, Tenn. - Wayne Seales Company
 Morrisville, Vermont - McMahon Brothers
 Philadelphia, Pa. - Warford-Eastern Co.
 Pittsburgh, Pa. - Warford Pittsburgh Co.
 Portland, Oregon - Woodward Sales Co.
 Richmond, Va. - Baker Equipment Eng. Co.
 Rockford, Ill. - Schacht Truck Company
 San Francisco, Cal. - Warford-Pacific Co.
 Seattle, Wash. - Warford-Equipment Co.
 Spokane, Wash. - George H. Dietrich Co.
 St. Paul, Minn. - McGee-White Corp.
 Stockbridge, Mich. - Transmission Sales Co.
 Tampa, Fla. - Wholesale Auto Supply House
 Washington, D.C. - J. J. Weeks' Son
 Wichita, Kansas - Warford Distributing Co.

Windsor, Ont., Warford Corp. of Can. Ltd.
 (Home Office)
 Toronto, Ont., Warford Corp. of Can. Ltd.
 Montreal, Quebec, A. C. Lewis
 Calgary, Alta. J. R. Good
 Vancouver, B. C. E. W. Jay

"It's sort o' interestin to reflect that them trees up back of the old Welsh place that started a growin' when Columbus was hockin' the crown jools had to wait for a Ford truck with a Warford transmission to git 'em to a saw mill so's they could be made into slap sticks for movie comedies."

Warford PRODUCTS

The Warford Corporation • 44 Whitehall Street, New York City, N.Y.

Neither the Warford Corporation nor its manufacturers has any connection whatsoever with any company manufacturing motor cars.

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

"THE MIXER THAT MIXES"

Would you like a mixing machine that turns out thoroughly mixed mortar in 5 to 10 seconds after material is placed in the hopper? If so, write to us to tell you more about

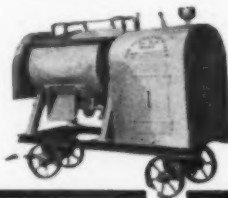
THE TAL-FLO MIXER

This mixer is built in three sizes: A, 4 cu. ft.; B, 7 cu. ft.; and C, 14 cu. ft., and will mix all kinds of mortar and other mixtures of materials used in construction work to any consistency better, and numerous other things that require a thorough mixing.

Special Features: No axle through the hopper for material to gather on. Roller bearings for main bearings. Alemite lubricating system.

Further information sent on request.

TALBOT-FLOOD MFG. CO., Inc.
621-22 Dwight Bldg. Kansas City, Mo.



"Clings to Metal"

A Densified Pennsylvania Oil

FOR

Displacing old-fashioned and inefficient cup greases and gear compounds.

"D-A" Lubricant

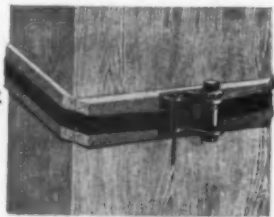
is especially adapted for use on heavy duty machinery and is sold by distributors of this type of equipment everywhere.

D-A LUBRICANT CO., Inc.

Plant and Home Office:

INDIANAPOLIS

INDIANA

**CLAMPS**

that are strong—
that can be used over and over again—
that are easy to place on any column—
that are easy to take off any column—
that save labor—
that are easy to store—
that fit any shape column—

THE W. A. K.

Column Clamps
Many Ohio contractors are now cutting costs by the use of these clamps.

W. A. KUHLMAN & CO.
TOLEDO OHIO
DISTRIBUTORS IN ALL LEADING CITIES

Army Cots, Blankets, Tents

ALL
SIZES

Any quantity. Write for free circular. Mention number wanted and we will send special quotation. Prompt shipment.



ARMY AND NAVY SUPPLY CO.

Dept. 1, Box 1935
RICHMOND, VIRGINIA

FOR SALE

Three-Drum Byers Steam Hoist complete with boiler and engine. Write or wire for price.

Coan Equipment Co.

236-42 Murray St., Ft. Wayne, Ind.

HARRISBURG'S CHOICE IS "DOMESTIC"

Below is shown a "Domestic" D-4 Single Diaphragm Pump and a "Domestic" 92-cu. ft. Portable Air Compressor Unit owned by the Water Department of the City of Harrisburg, Pa. Reliable—easily moved from one location to another—these units are popular with all who use them.

Road Builders, General Contractors, Municipal Departments, etc., want the best equipment they can get—

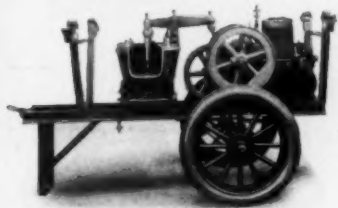
That's why they specify
"DOMESTIC"

Let us give you the facts.

DOMESTIC ENGINE & PUMP COMPANY

SHIPPENSBURG

PA.



"Domestic" D-4 Single Diaphragm Pump
on 2-Wheel Ford Trailer.

LOCOMOTIVE BOILERS

for

Contractors' Equipment



Designed for use with Superheaters, Automatic Stokers, Fire tile Arches, Arch tubes, Circulators or other special features to give the highest efficiency in YOUR service.

JOHNSTON BROS., Inc.

Specializing in Boilers for Contractors' Equipment

FERRYSBURG, MICHIGAN

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

WIARD

Combination Rooter and Furrow Plow



The beam is simply strong to carry the plow bottom through any condition where otherwise a rooter would be necessary.

WIARD PLOW COMPANY
BATAVIA, N. Y.

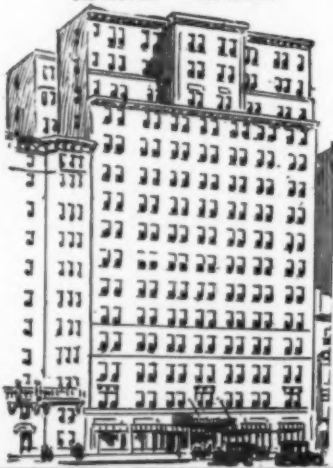
PLOWS

HOTEL KNICKERBOCKER

120-128 West 45th Street
Just East of Broadway, Times Square
New York's Newest Hotel

A location unsurpassed. A few seconds to all leading shops and theatres. Away from the noise and bustle and still convenient to everything. Between Grand Central and Pennsylvania Terminals.

Rates \$3 to \$5 per Day
400 Rooms - - 406 Baths



Aeroil
BURNERS

"Smokeless" — "Oil Burning"

Asphalt Melting Kettles Pavement Surface Heaters
Lead Melting Furnaces Sand Drying Pans
Patrol Patching Heaters Portable Karosses Torches
Paving Tool Heaters Oil Burners for Kettles

No Smoke—No Sparks—No Ashes—Just Heat!

Send for Illustrated Catalogues and Testimonials

AEROIL BURNER COMPANY, Inc.
UNION CITY NEW JERSEY

EAGLE

Universal Steel Dump Bodies



1 cu. yd. to 2 cu. yd. level capacity. Gravity or Underbody Hoist Type for Ford, Reo, Chevrolet, Graham, International, etc.

THE EAGLE WAGON WORKS
Auburn, New York

Statement of the Ownership, Management, Circulation, etc., Required by the Act of Congress of August 24, 1912, of The Contractors' & Engineers' Monthly, Published Monthly at New York, N. Y., April 1, 1926.

State of New York, County of New York, ss.:

Before me, a Notary Public, in and for the State and County aforesaid, personally appeared EDGAR J. BUTTENHEIM, who, having been duly sworn according to law, deposes and says that he is the President of the Buttenheim-Dix Pub. Corp., Publishers of THE CONTRACTORS' AND ENGINEERS' MONTHLY and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:
Publisher BUTTENHEIM-DIX PUB. CORP., 443 4th Ave., N. Y. C.
Editor, T. R. KENDALL
Managing Editor, None
Business Manager, THEO. R. KENDALL.

2. That the owners are: (Give names and addresses of individuals owning, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.)

BUTTENHEIM-DIX PUB. CORP., 443 4th Ave., N. Y. C.
Stockholders: EDGAR J. BUTTENHEIM 443 4th Ave., N. Y. C.
J. T. DIX, Chicago, Ill.

HAROLD S. BUTTENHEIM } 443 4th Ave., N. Y. C.
THEO. R. KENDALL
HERBERT K. SAGE L. P. ANDERSON

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: (If there are none, so state) None.

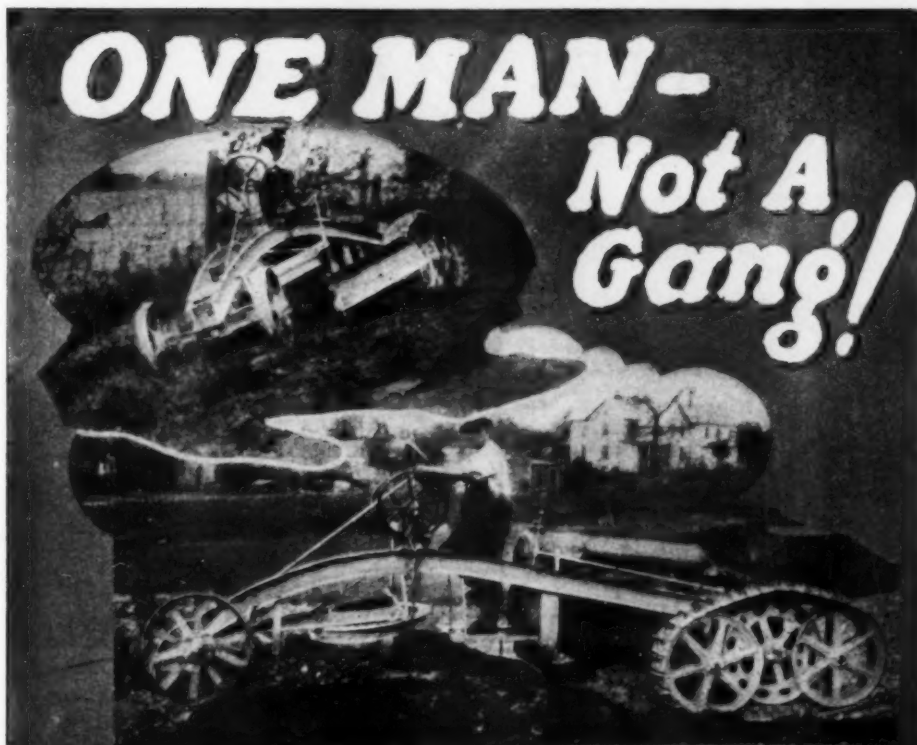
4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for statements embracing affiant's full knowledge and beliefs as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

BUTTENHEIM-DIX PUB. CORP.
EDGAR J. BUTTENHEIM, President

Sworn to and subscribed before me
this 1st day of April, 1926.
New York County Clerk's No. 283.
My commission expires March 30, 1927.)

H. RADNITZ
Notary Public
Kings County, N. Y.

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.



ONE salary—not a payroll. That's H. P. economy.

The H. P. "One Man" Grader with attachments effects a saving of as high as 80% of road cost in scarifying, scraping and rolling which is done in one operation.

With our Rigid Rail Tracks the tractor becomes a powerful crawler that will not balk at obstructions.

Equipped with rubber wheels the Grader becomes a highway "patroller" of remarkable economy, speed and utility. Every part of a H. P. Grader is

built to stand the great strains imposed in road work.

As the development of the H. P. "One Man" Grader has been based upon the collective experience of highway officials, contractors and engineers, it represents a distinctly advanced type of equipment.

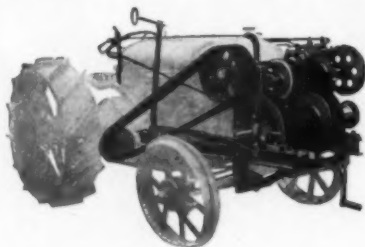
Handy controls enable "One Man" to maneuver the H. P. "One Man" Grader on any kind of ground all day without tiring.

Write for our interesting literature today.

GRADERS—DU-PAT SCRAPERS—H. P. and CAHL TRACKS

THE HADFIELD-PENFIELD STEEL CO.
BUCYRUS, OHIO

The PIONEER Porta-Hoist



ATTACHED to the front of a Fordson Tractor, it will perform any hoisting operation efficiently and economically. Does not interfere with using tractor for draw-bar work. Has extended main drive shaft for carrying belt pulley. It is low in price. Send for more information.

PIONEER TRACTORS, Inc.
WINONA, MINN.

A Powerful Little Brute!



Raises TEN TONS easily with one hand. Pump the handle. Up goes the load. Short stroke or full, it holds all you gain. Fine in cramped places where no other jack could work. A turn of the fingers lowers the load. UNDER INSTANT CONTROL, stopping gently AT ANY POINT. A brute for service. Stands up under hard, continuous, rough work. 11 inches high, 26 pounds, \$35. Sold through jobbers exclusively. Write for descriptive folder.

THE OIL JACK COMPANY, Inc.
110 West 40th Street, New York

ABRAM Double Action Finishing Tools *"They put a man on his feet."*



The steel float illustrated here is as fine a tool as the well-known Abram long-handled trowel. For rough surfacing, for road work, and wherever a high grade float finish is desired, this float of heavy steel will cut finishing costs seventy-five per cent.

There is an Abram double-action tool for every type of work. Send for catalog.

ABRAM CEMENT TOOL CO.
3818 Grand River Avenue Detroit, Mich.
Publishers of "The Finishing Touch"

HOISTING BLOCKS STAR BRAND *Are Always Reliable*

Made For
Every Condition of Service

Sold By
Leading Supply Houses

or
BOSTON & LOCKPORT BLOCK CO.
NEW YORK EAST BOSTON CHICAGO



The "High Sign"

THE WAUGH sign on a Rock Drill, Drill Steel Sharpener, Concrete Breaker or Clay Digger, is the contractor's assurance of high speed, high efficiency, and completely satisfactory performance.

THE DENVER ROCK DRILL MFG. CO.
DENVER, COLORADO



The Miami Scraper Picks Up and Carries a Full Load Where You Want It.

Ninety per cent of your cost of moving loose earth by tractor consists of drivers' wages, gasoline, oil and general upkeep, or \$10.00 to \$12.00 per day.

You must move a given number of cubic yards to repay you this expense.

Your profit comes only from the EXCESS cubic yards above this given number.

The Miami One-Man Power Scraper delivers twice the yardage of the drag type scraper, because the scoop pan is elevated in front and carries the load on Roller Bearing wheels in high-speed, if you wish.

Your operator delivers a full load where you want it.

This excess yardage means \$10.00 to \$15.00 per day operating profit.

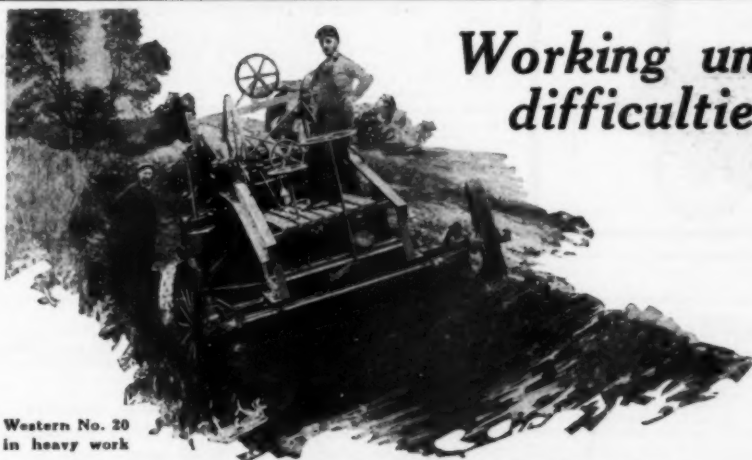
Are You getting it?

One man operates both tractor and scraper. Write today for complete information.

THE MIAMI TRAILER-SCRAPER CO.
610 S. Clay St. TROY, OHIO

MIAMI one man power **SCRAPER**

Reg. U. S. Pat. Off.



Working under difficulties

Western No. 20
in heavy work

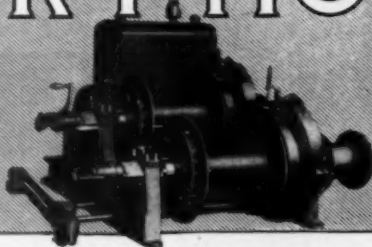
No handicap to AUSTIN-WESTERN graders

For over 40 years Austin-Western graders have met and defeated all obstacles and problems in highway construction. With thousands of these machines demonstrating their supremacy, sales are increasing yearly. *Send for our big grader catalog.*

Catalogs of Rollers, Crushers,
Sweepers, Sprinklers, Road Oilers,
Dump Wagons, sent on request.

The Austin-Western Road Machinery Co.
400 N. Michigan Ave. Chicago, Illinois

FLORY HOISTS



For stamina, endurance and dependability, Flory Hoists are in a class by themselves. Flory Hoists have been making good for more than a half-century. Electric, steam, gasoline and belt driven hoists.

Flory also builds cableways, dredging machinery, and slack line outfits.

S. FLORY MFG. CO., BANGOR, PA.

SALES AGENTS IN PRINCIPAL CITIES



STYLE
"A-1"

CONNERY'S IMPROVED Tar and Asphalt Heaters

Style "A-1" is especially designed for maintenance work and is equipped with Connery's Improved Springs, ash pan and reinforced patented ribs. This heater can also be furnished with rubber tired wheels and roller bearings.

We manufacture a full line of Tar and Asphalt Heaters, Sand and Gravel Dryers, Oil Burning Heaters, Pouring Pots, etc.

Send for our little "Blue Book" illustrating our many specials in Tar and Asphalt Heaters—we build just what you want, for road work or general construction.

CONNERY & COMPANY, Inc.
4000 N. Second Street Philadelphia, Pa.

HAUCK ASPHALT TOOL HEATERS

"The Hauck kerosene tool heater is lighter, better designed, more convenient, easier to operate, cleaner, and more economical than a wood and coal heater of the same heating capacity. We would not now consider going back to the wood and coal heaters."

Let us send you the complete story with performance and cost data.

HAUCK MANUFACTURING CO.

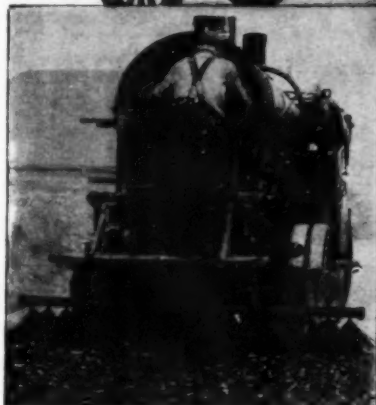
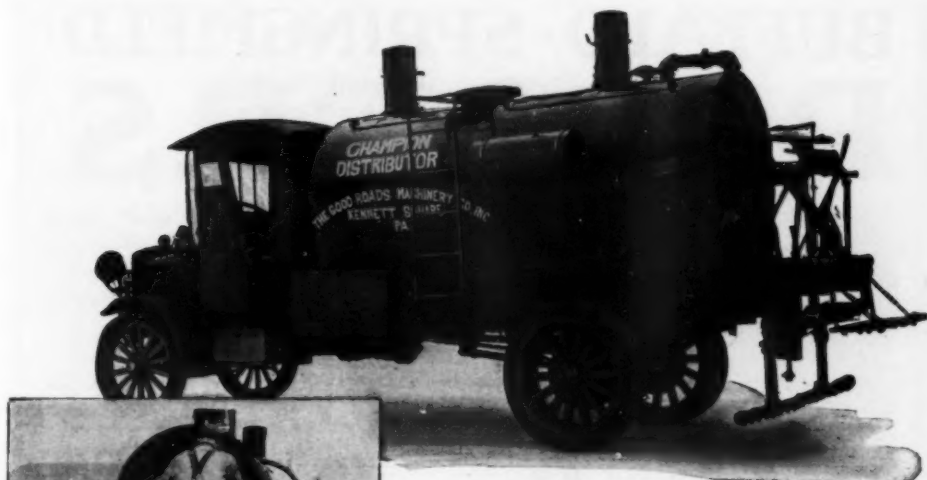


140 TENTH STREET
BROOKLYN, N. Y.

HAVE YOU SEEN

the lists of valuable catalogs on pages 114 and 116. A careful study of these pages will be of help to you in locating the machinery, materials or apparatus you want.

CATALOGS YOU NEED



Champion Distributor Applying Material
in Iron County, Michigan

Everything for the Road Maker

Road Graders
Road Drags
Road Oiling Machines
Heating Kettles
Rock Crushers
Steam Road Rollers
Tandem Rollers
Engine and Boiler
Corrugated Culvert Pipe
Car Unloaders
Road Plows
Gravel Screening Plants
Rooter Plows
Drag Scrapers
Wheel Scrapers
Dump Wagons
Street Sweepers
Sand and Gravel Plants



Summer Traffic Needs Good Roads

THE application of bituminous binders, in dust laying, in resurfacing, in new construction and other phases of road work is increasing at an amazing rate.

Now is the time to prepare the roads for the heavy summer traffic!

The Good Roads Champion Pressure Heating Distributor

was designed and built to meet every requirement in the application of asphaltic oils and tar products. The Champion Distributor consists of a heavy steel frame supporting an encased tank, a centrifugal pump, a battery of kerosene oil burners, a fuel oil tank, a cleansing fuel tank, an air pump, operating valves, safety valve and distributor.

Tanks of 600—800 and 1000 gallon capacity can be furnished that can be mounted on any standard motor truck.

This Distributor will prove a sound investment and a forward stride in the reduction of costs.

Send for Catalog K E L

The
GOOD ROADS MACHINERY CO., Inc.
KENNETT SQUARE, PENNA.

PORTLAND, ORE. 3rd & Hawthorne Sts.
SAN FRANCISCO, CAL. 26 Fremont St.
LOS ANGELES, CAL. 931 Santa Fe Ave.
CHICAGO, ILL. 49th & Halsted Sts.
PITTSBURGH, PA. 1523 Oliver Bldg.
ATLANTA, GA. 569 Whitehall St.
NEW YORK, N. Y. 50 Church St.
PHILADELPHIA, PA., 2037 Commercial Trust Bldg.
WATERTOWN, MASS. 36 Pleasant St.

Good Roads MACHINERY

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

BUFFALO-SPRINGFIELD ROLLERS



All Types and Sizes
With or without Scarifier
attachment.

Helps you finish the job
on time.



Send for catalog A for complete information.



The Buffalo Springfield Roller Co.
Springfield, Ohio.



Sullivan Portable Air Compressors



When you need air power on the job QUICK, for drilling, rock excavation, concrete removal, hoisting, riveting, etc., a Sullivan Portable Compressor is the answer.

Sullivan Portable Gas Engine driven compressors come in 110, 170, 220, 320, ft. sizes, and may be had on steel wheels, skids, or motor truck mounting.

They are sturdy, reliable, all season rigs. Ask for pictorial booklet "Speed up with Air."

SULLIVAN
MACHINERY COMPANY

182 S. Mich. Ave., Chicago
Branches and Dealers in all principal cities



The BARTON Portable Pump

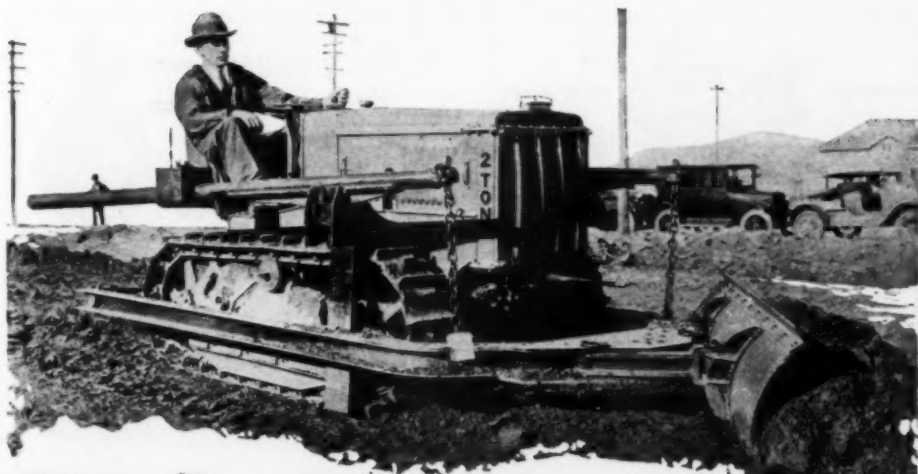
Capacity Up to 750 Gal. Per Minute

A portable pump of that capacity has almost unlimited general use. On any job where drainage must be accomplished by mechanical means the Barton Portable Pump will do the job at little labor and expense. An Automatic Primer is standard on all Barton Portable Pumps.

Write for Bulletin No. 56.

AMERICAN STEAM PUMP CO.

Battle Creek, Mich.



Make Long Profits from short seasons

"Caterpillar" Tractors provide their owners with insurance against bad weather and short working seasons. The wide tracks ride the soft spots—ample power crowds the work into fewer days. On the job as soon as winter is over—more work before the next winter comes. Traction—power—dependability!

CATERPILLAR TRACTOR CO.

Executive Offices: San Leandro, California, U. S. A.

Factories: Peoria, Illinois - San Leandro, California

New York Office: 50 Church Street

Successor to

BEST C. L. Best
Tractor Co.

The Holt Manufacturing Company **HOLT**

Prices on "Caterpillar" Tractors:

F. O. B. Peoria, Ill.

SIXTY . . . \$5500

5-TON . . . 3650

2-TON . . . 1950

F. O. B. San Leandro, Calif.

SIXTY . . . \$5500

THIRTY . . . 3400

45-526



When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.



More Flexible Crawler Power

With the Trackpull-equipped Fordson you have the lowest cost, most flexible crawler power possible to obtain.

With the Trackpull crawler the Fordson will do as much or more work than any two ton crawler tractor. Yet the first cost and the expense of operation and maintenance is much less.

Two or more Fordsons equipped with the Trackpull crawler can be purchased for the price of one larger outfit. This permits you to handle a number of jobs at the same time and at a lower cost per job.

Ask the nearest Ford dealer about the Trackpull or write us for further information.

**BELLE CITY
MANUFACTURING CO.**
RACINE, WISCONSIN

Write to Dept. DJ-5



PICKERING GOVERNORS

Reduce Fordson Expense

It costs less to operate a Fordson equipped with a Pickering Governor.

For the Pickering closely regulates the power for the load because it responds instantly to the slightest load change.

As a result the saving in fuel is considerable. Users write us—enough in 60 days to pay for the Governor.

Reduced fuel bills, however, aren't the only advantages of equipping with a Pickering.

Pickering equipped Fordsons maintain steady, even power and uniform speed at all times.

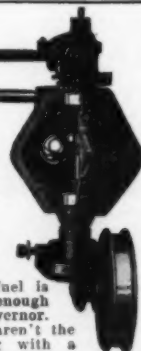
And because Pickering Governors minimize the wear and tear on the motor, the Fordson is in active service years longer than its natural span of life.

Steady, even, full power, reduced fuel and repair bills, and longer tractor life are possible because Pickering Governors are the only governors made without joints or links—an engineering principle which maintains the closest regulation under severe and continuous service.

Write for pamphlet 0160 which tells about other Pickering advantages such as the built-in Speed Changer, a device which permits a wide range of speed adjustments without shutting off the motor.

THE PICKERING GOVERNOR CO.
PORTLAND CONNECTICUT

"Governor Builders Since 1860"



THE MONEY-MAKER



Type P3—Wheel Mounted
Type Q3—Crawler Mounted

NELSON FORDSON LOADER

Capacity 100 cu. yds. an hour
Interchangeable Mountings

The Biggest Dollar's Worth
for Stock-piles, Batching or Grading

N. P. NELSON IRON WORKS, Inc.
Allwood, Passaic, N. J.

What About Old Pavements?



IN many communities where cost is a question of prime importance, the citizens are putting up with old and unsatisfactory pavements, year after year, because they are under the impression that the cost of new pavements would be prohibitive.

In many cases, these old pavements would make an excellent base for sheet asphalt surfacing. Since no other foundation is necessary, the cost is small.

The accompanying photographs show three streets in Rhineland, Wis., which were surfaced with

Stanolind Paving Asphalt

The sheet asphalt was laid directly upon old waterbound macadam and gravel streets. No new foundation material was used, and no preparation was made other than evening up the old pavement and rolling it thoroughly. At a minimum cost, Rhineland now has streets which compare favorably with those of any large city in the country.

Our highway engineers will be glad to make a survey of the roads and streets of any community and recommend the grades of asphalt or road oil which will give the best results. No charge is made for this service.

STANDARD OIL COMPANY

[INDIANA]

910 S. Michigan Ave.

Chicago, Ill.

Stewart's MAKE MORE MONEY—



Patent Applied for

Equip your Ford Truck with a Stewart Quick Acting Self-Dump Steel Body. Operates from the driver's seat—no power, no hoist, nothing to get out of order. Order yours today—it's fully guaranteed. Or write for complete information.

THE STEWART IRON WORKS CO., Inc.
Covington, Ky. Cincinnati, Ohio

GODWIN STEEL PAVING GUARDS

PROTECT THE EDGES OF
STREET, ROAD, CURB &
STREET RAILWAY
PAVING.

Write for Illustrated Catalog No. 23.



W. S. GODWIN CO., Inc.
Race & McComas St., Baltimore, Md.

CHAUSSÉ

Oil Burning Tool
and Surface Heaters
Kerosene Torches
Portable Asphalt Plant

CHAUSSÉ OIL BURNER CO.
1227 W. Beardsley Ave., Elkhart, Ind.



BERG in use at new Columbia Power Station, Cincinnati, Ohio. Foundation Company, New York City, contractors.

BERG CONCRETE SURFACER AND FINISHER

Removes Fins, Board or Form Marks and ALL Surface Irregularities from Concrete.

Specified by leading architects, builders, contractors and engineers on the country's biggest jobs. Insures satisfactory results—does the work quickly—efficiently—economically. Let us show you how the BERG will cut YOUR costs.

Supplied for either 110-125 or 220-250 volts, AC or DC.

Write for complete details and list of prominent users.

The Concrete Surfacing Mach'y Co.
4669 Spring Grove Ave., Dept. F.
Cincinnati, Ohio.



Coming Through "WATSON" Bottom Dumping Wagons

Maintain Leadership in Team and Tractor Hauling Field.

Capacities, One to Five Yards, Plain or Roller Bearing Axles.



Standing The Shovel Blow
Steel or Solid Rubber Tired Wheels Hitches may be obtained to convert your Watsons for tractor work.

May we send you Suggestive Literature to help solve that knotty hauling problem?

WATSON TRUCK CORPORATION

CANASTOTA, N. Y.

Corrugated Culverts With a Pedigree

It isn't often that an inanimate object may be said to have a Pedigree, but when we tell you that "GENUINE OPEN HEARTH IRON" entering into the construction of our NEWPORT CULVERTS, has been of the same general character since its inception, without a change in the analysis, or in the copper content of the product since that time, it is easy to see why we claim Noble Lineage for our culverts.

If culverts may be said to have ancestors, those that have preceded the present output of our shops have shown by their Dependability, Tenacity and General Stick-to-iveness, that your faith in the NEWPORT CULVERTS of today is well founded.

No wonder then that the first users of "GENUINE OPEN HEARTH IRON" culverts of years ago have refused to change their minds about the superiority of our product.

We make either the Full Circle Round Riveted type of pipe, or the Half-Round-Flat-Bottom type for small town use, and ship the day you want it.



*Write for descriptive
literature and further
data.*



When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you,



Next to Quality—Delivery

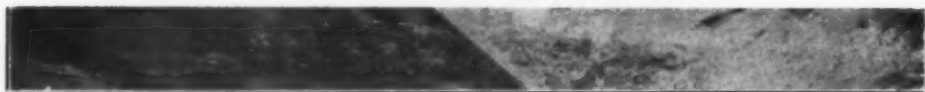
To a contractor who has been awarded a paving job, *delivery* of his materials is a major consideration.

The Texas Company thoroughly realizes this, and *prompt deliveries* is its constant goal.

The shipping facilities of this organiza-

tion are regularly being increased. In fact, the amount of attention given to this phase of company activity is second only to the care exercised in the actual refining of TEXACO ASPHALT.

Contractors have paved with TEXACO in more than 1175 cities and towns.



TEXACO

New York
Philadelphia
Richmond
Boston
Jacksonville
Little Rock



THE TEXAS COMPANY, U.S.A.

Asphalt Sales Department

17 Battery Place, New York City

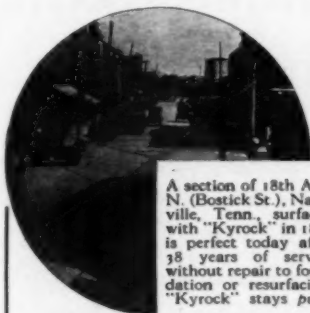


Chicago
Cleveland
Kansas City
Dallas
St. Louis

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you,

Kyrock

"The ORIGINAL Kentucky Rock Asphalt"



A section of 18th Ave. N. (Bostick St.), Nashville, Tenn., surfaced with "Kyrock" in 1888 is perfect today after 38 years of service without repair to foundation or resurfacing. "Kyrock" stays put.

**New
Streets
for Old!**

Write today for a copy of "New Streets for Old" and learn how the worn streets and roadways of your City and County can be transformed into smooth, resilient highways with Kyrock, at a nominal cost. Records of Maintenance Cost on all accepted high types of surfacing show Kyrock to be least.

NEARLY FIVE MILLION square yards of "Kyrock" surfacing laid in 1925.

Time unfolds a convincing record of "Kyrock" service. Each job proves its better value as a wearing surface over every accepted type of base. Engineers and City Officials are observing and each year "Kyrock" is specified in ever increasing yardage.

"Kyrock" is the original Kentucky Rock Asphalt. It is blasted out of the hills of Edmonson County, Kentucky, and crushed down to its original sand grains. Nothing is added — nothing is taken away. As nature made it—so it is laid. It is *guaranteed* uniform to 1-10 of 1 per cent. "Kyrock" is laid *cold*—no mixing, no heating, no costly equipment or experts required.

KENTUCKY ROCK ASPHALT CO.
Incorporated
LOUISVILLE, KENTUCKY

Kyrock
The Perfect
Pavement





Russell Motor Patrol

MADE IN TWO SIZES

No. 2—Fordson Tractor for Power
No. 3—McCormick Deering 10-20 Tractor for Power
 Better Built Motorized Patrol Graders

Daily growing more popular—
 the demand rapidly increasing—

No. 2 Russell Motor Patrol weighs 8500 lbs.
 No. 3 Russell Motor Patrol weighs 10500 lbs.

Write for Catalog describing our full line

RUSSELL GRADER MFG. CO.

Factory and General Offices

MINNEAPOLIS, MINN.

Affiliated plants—Cicero, Ill., North
 Kansas City, Mo., Memphis, Tenn.,
 Dallas, Tex.



Marion Dump Body



Length: 72 inches. Width: 45
 inches. Sides: 18 inches.
 Front and end gate: 24 inches.
 CAPACITY: 34 cubic feet.

Here it is—the real producer that never balks. It's
 durable and dependable.
 Marion bodies can be used with hand hoist or as an
 automatic type.

This is a most satisfactory Dump Body for handling

stone, gravel,
 sand, dirt, coal
 and other loose
 material. Always
 ready for the
 hardest kind of
 service.

The Marion is
 the favorite of
 leading Highway
 Contractors. It
 is the dump body
 of exclusive fea-
 tures.



Showing Marion Body
 equipped with automatic sub-
 frame.

THE MARION STEEL BODY CO.
MARION, OHIO

Try the Milburn Light on the Job

Here are a few things you will find:

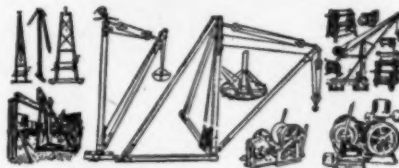
1. 8,000 candlepower costs 3c hour.
2. Absolute automatic operation.
3. Burns continuously or intermittently.
4. Uses any kind of carbide.

Write for booklet 223

THE ALEXANDER MILBURN CO.

Baltimore, Md.

Note our Distributors on following pages

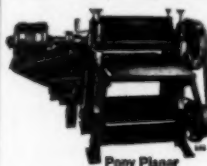


WE HAVE A COMPLETE LINE
 OF DERRICKS AND WINCHES

SASGEN DERRICK CO.

3103 W. Grand Ave.

Chicago, Illinois



Pony Planer

Agents wanted for open territory

Speed up work
 this WAY

Save time by taking your
 shop to your job. The Amer-
 ican woodworker performs
 14 woodworking operations.
 Four men can work at it, at
 once. Write for details of
 this and other cost-cutting
 machinery.

AMERICAN
SAW MILL MACHINERY CO.

MAKERS OF WOODWORKING AND SAW MILL MACHINERY
 171 Main Street Hackettstown, N. J.

HONHORST TAR HEATERS

"Built for service"

ALL STYLES

Portable and Stationary
 25 to 200 gallons

See our page in Street Construction Section
 Municipal Index for the Kettle you need

or

Write for Catalog.

THE JOS. HONHORST CO.

1016 W. 6th St.

Cincinnati, O.

A new booklet that tells the facts about CONCRETE CURING

JUST published! A new Solvay booklet that gives you the complete story, the very latest information about concrete curing with Calcium Chloride.

Here you will find authoritative specifications for surface application and for integral use—charts, tables and photographs that prove the value of Calcium Chloride as the superior curing agent.

SOLVAY CALCIUM CHLORIDE

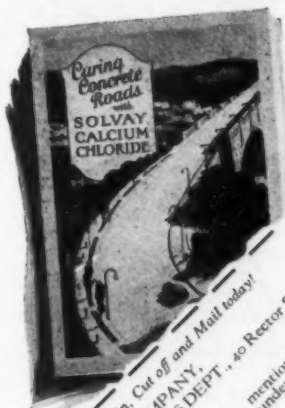
Every engineer, contractor and road official needs this booklet. And it's free—just send in the coupon—do it now!

THE SOLVAY PROCESS CO.

WING & EVANS, Inc., Sales Dept.

40 Rector St. New York

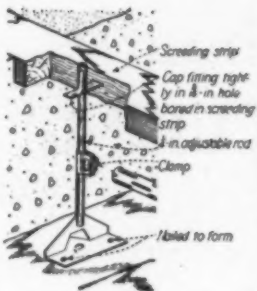
*Mail
the coupon
now*



Fill in. Cut off and Mail today!
THE SOLVAY PROCESS COMPANY.
WING & EVANS, INC., SALES DEPT., 40 Rector St., New York.
Gentlemen:
Kindly send booklet No. 2041, mention nearest shipping
point and quote price. I am under no obligation in
requesting this information.
Name.....
Address.....
City.....
State.....

CLAMPS

SPEED UP YOUR WORK



Targets—Simplify leveling concrete slabs by standardizing the operation. They save labor and concrete.

Wire Clamps—Use wire clamps on every job and save labor. They will clamp wall, beam or column forms.

Splicing Clamps—Save labor, lumber and nails. They are fast, safe and all in one piece.

Column Clamps—These clamps have perfect adjustment and are fast to place or release.

No special tools are required to place or release any M & M Form Clamps.

Samples, literature and Prices mailed on request.

M. & M. FORM CLAMP CO.
2 Fifth St. S. E. Minneapolis, Minn.

YOU CAN DEMAND more---and still more from this roller

In this four-cylinder, heavy-duty HUBER Motor Roller are combined all of the features that go to make up a real serviceable and dependable Road Roller. It has a powerful motor—is practically vibrationless and changes quickly from forward to reverse. Of course you want to learn more about the Huber Four-Cylinder Motor Roller. A book which describes it in detail is just out. Send for a copy.

THE HUBER MANUFACTURING CO.
305 E. Center St. Marion, O.



MORE CASH- LESS LABOR

CRESCENT Concrete Machinery is money making equipment, built for quantity production without breakdowns. Our prices to you mean real savings in first cost and the quality of our machines means bigger profits for years to come with less back breaking labor.

Write for Free Bulletin:

CRESCENT Sewer Pipe and Tile Moulds, Catalog 11 and Bulletin 33.
Brick Machines, hand, foot and power, Catalog 32.
Bull-dog batch Mixers, Catalog 37.
Bull-dog Tilt Mixer, Bulletin 42.
Power Block Tampers, Bulletin 36.
CRESCENT Continuous Mixers, Catalog 10.

Raber and Lang Mfg. Co.
831 Mill St., Kendallville, Ind.



DIXON'S WATERPROOF GRAPHITE GREASE

The graphite is the vital element, for it imparts to bearing surfaces a remarkable smoothness that relieves the grease of a very considerable portion of its task of keeping metallic bearing surfaces apart and takes upon itself the wear which would be borne by the metal. The flake graphite increases both the efficiency and endurance of the lubricant.

Dixon's Waterproof Graphite Grease is of dense consistency, suitable for general heavy service with slow speeds and heavy pressures.

It possesses a remarkable adhesiveness and cannot be washed off, even by running water, sea water, or alkaline and sulphuric mine water. It cannot gum or become rancid. As a rust preventive it is unsurpassed.

Write for Circular 148-W.

JOSEPH DIXON CRUCIBLE CO.

Jersey City, N. J.  Established 1827

Distributors of Contractors' Equipment

THE following cards (arranged by states) show the names of dealers in contractors' equipment and supplies with a record of the various lines handled. Contractors will find this list a convenient means of getting in touch with dealers who make a point of giving satisfactory service and prompt shipments. This directory is constantly consulted by our subscribers and any suggestions regarding it will be welcomed. :

ALA.—ARK.—CALIF.

C. B. DAVIS ENGINEERING CO.

Brown Marx Bldg.

Birmingham, Ala.

CRANES

CRUSHING

HOISTS

EQUIPMENT

CONVEYORS

DREDGES

BELTS

PUMPS

BUCKETS

REPRESENTING

Robins Conveying Belt Company

Morgan Engineering Co.

Nordberg Mfg. Co.

Wheeler Condenser Co.

Aldrich Pump Company

Bay City Dredge Works

Williams Bucket Co.

JOE LYONS MACHINERY CO.

Contractors' Equipment and Supplies

112 Louisiana St. Little Rock, Ark.

Representing:

REX—Mixers and Pavers

CLYDE — SAGEEN—Derricks and Hoists

BLAW-KNOX—Curb, Gutter and Road Forms, Bins, Batcher, Clamshell Buckets, Truck Turntables

RED STAR—Wheelbarrows and Concrete Carts

RED EDGE—Shovels and Picks

BARNES—Pumps and Compressors

NORTHWEST—Shovels, Cranes and Draglines

IDEAL—Concrete Block Machinery and Molds

CLIMAX — LEROI — FULLER & JOHNSON—Engines

OIL PULL—Road Tractors

Also anything else a contractor uses

JOHN D. TURNER

921-927 Pioneer Bldg.

Birmingham, Alabama

MATERIAL HANDLING EQUIPMENT

REPRESENTING

Barber-Greene Co.—Portable Conveyors, Self Feeding Bucket Loaders, The Ditcher With The Vertical Boom.

Easton Car and Construction Co.—Industrial Cars and Track-Turntables, Roll Over Dump Bodies.

Lakewood Engineering Co.—Concrete Construction and Road Building Equipment.

Nordberg Manufacturing Co.—Tracklifters, Shovelers.

Northwest Engineering Co.—Crawler Cranes, Draglines, Shovels.

Shaw-Enoch Co.—SHAWNEE Road Builder and Maintainer.

Universal Crane Co.—Truckcranes.

Geo. D. Whitcomb Co.—Electric and Gasoline Locomotives.

The BROWN-BEVIS CO., Inc.

470 East Third Street

Los Angeles, California

DISTRIBUTORS

T. L. Smith Co.—Concrete Mixers, Pavers and Excavators

J. D. Adams and Co.—Adams Leaning Wheel Graders.

Byers Machine Co.—Hoists, Cranes and Truckcranes

Wood Shovel & Tool Co.—Wood Molybdenum Shovels

Lakewood Engineering Co.—Concrete Placing Machinery and

Road Finishers

Geo. Hains Mfg. Co.—Truckloaders and Conveyors

Barnes Mfg. Co.—Barnes Pumps

The Owen Bucket Co.—Clam Shell Buckets

The Buckeye Traction Ditcher Co.—Curb and Trench Ditchers

Watson Truck Corporation—Dump Wagons

Universal Crusher Co.—Crushers

Traylor Engineering & Mfg. Co.—Rock Crushing Equipment

Monarch Tractors, Inc.

Four Wheel Drive Auto Co.

Member: Associated Equipment Distributors

The Young & Vann Supply Co.

Birmingham, Ala.

Complete line of Contractors' Equipment and Supplies.

REPRESENTING

Smith Concrete Mixers and Pavers

Novo Hoists, Pumps, etc.

Blaw-Knox Steel Forms, Batcher Plants, Clam

Shell Buckets

Thew Gas, Steam and Electric Shovels

Baker Backfillers and Unloaders

Archer Concrete Towers

Watson Dump Wagons

Red Edge Shovels and Picks

Akron Wheelbarrows

Carey Elastite Expansion Joint

M. & M. Form Clamps

Jones Superior Machine Co.

COAST MACHINERY CORPORATION

464 East Third St., Los Angeles, Calif.

829 Folsom Street, San Francisco, Calif.

Representing:

T. L. SMITH COMPANY—Concrete Mixers &

Pavers

CLIMAX ENGINEERING CO.—Industrial gas

engines

CUSHMAN MOTOR WORKS—Gas Engines

UNIVERSAL MOTOR CO.—Gas Engines

CONCRETE SURFACING MACH. CO.—Con-

crete Surfacers and Finishers.

DEMING PUMP COMPANY—Pumps

HUMPHRIES MFG. CO.—Power Pumps

RALPH B. CARTER CO.—Diaphragm Pumps

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Collins-Kay Machinery Co.

438 E. 3rd St. Los Angeles, Cal.

Clark Tractor Co., Truclifts and tractors.

Bris Steel Const. Co., Clamshell buckets and aggregators.

Fate-Boat-Heath Co., Gasoline Locomotives.

Koppel Sales Co., Cars and rails.

J. S. Mundy Hoisting Engine Co., Steam, Electric and Gasoline hoists.

Northwest Engr. Co., Gasoline & full Diesel shovels, draglines and cranes.

Northern Engr. Works, Electric overhead traveling cranes.

Deister Concentrating Co., LEAHY No-Blind vibrating screens and concentrators.

Essick and Company1928 Santa Fe Avenue
Los Angeles, Calif.*Representing*

NOVO ENGINE COMPANY

LAKEWOOD ENGINEERING CO.

C. D. EDWARDS MFG. CO.

STANDARD STEEL WORKS

PEERLESS MACHINERY CO.

IDEAL CONCRETE MACHY. CO.

Concrete Machinery & Supply Co.

2014 Santa Fe Ave., Los Angeles, Calif.

Construction and Industrial Equipment

Rex Pavers

Butler Bins and Batchers

Williams Buckets

Rex Concrete Mixers

National Hoists

Archer Hoist Tower & Spouting

Blystone Plaster and Mortar Mixers

Concrete Pipe Forms

Orton & Steinbrenner Cranes & Shovels

Continental Engines

National Pile Hammers

Le Roi Engines

Red Star Wheelbarrows and Carts

Connaut Shovels

Member: Associated Equipment Distributors

GARLINGHOUSE BROS.

2044 Santa Fe Ave., Los Angeles, Cal.

Southern California Distributors For:

Blaw-Knox Co.—Steel Forms, Road Building Equipment

Dobbie Fdy. & Mach. Co., Derricks

Insley Mfg. Co.—Concrete Placing Equipment,

Excavators

Domestic Eng. & Pump Co.—Pumps, Compressors,

Engines

Smith Engineering Wks.—Crushers and Gravel

Plant Equipment

The Knickerbocker Company—Concrete Mixers

and Saw Rigs

Orr & Sombower, Inc.—Hoists and Rollers

McKiernan-Terry Drill Co.—Pile Hammers

Atlas Engineering Co.—Conveyors

Telephone, AXridge 1234

**Construction Machinery Co.
of California**

455 E. 3d St. Los Angeles, Calif.

American Saw Mill Machinery Company

Sagen Derrick Company

Construction Machinery Co., Waterloo, Iowa

Sidney Steel Scraper Co., Barrows only

Indiana Rolling Mills Shovels

Crescon Morris Company

Silver Manufacturing Company

Fuller & Johnson Mfg. Company

Norris K. Davis Company

RANSOME AND McCLELLAND Inc.824 Monadnock Building
San Francisco, Calif.*Representing*

Ransome Concrete Machinery Co.

Mixers, Pavers, Towers, Spouting

Novo Engine Co.

Engines, Hoists, Pumps, Compressors

Blaw-Knox Co.

Steel Forms, Clamshell Buckets, Batch Plants

National Hoisting Engine Co.

Steam Pile Hammers

Steam Hoists

**The Contractors Equipment
Company Inc.**

1910-1920 Santa Fe Ave., Los Angeles, Calif.

REPRESENTING

Acme Road Machinery Co.

The Foote Co., Inc.

The Freeman Manufacturing Co.

Hercules Motors Corp.

Indiana Rolling Mill Co.

The Jaeger Machine Co.

O. S. Johnson Co.

Mandt Co.

Mead-Morrison Manufacturing Co.

Pioneer Bucket Co.

Geo. D. Whitcomb Co.

Wizard Flow Co.

O. K. Clutch & Machinery Co.

Smith-Booth-Usher Co.Los Angeles San Francisco
228-238 Central Ave. 50-60 Fremont St.*Distributors for*

Barber-Greene Co.

Thew Shovel Co.

Clyde Iron Works Sales Co.

Milwaukee Locomotive Mfg. Co.

Sanermaa Brothers Co.

Buda Co.

Goulds Mfg. Co.

Hercules Gas Engine Co.

Lincoln Electric Co.

Barber Asphalt Co.

Owens Bucket Co.

Norwalk Co.

"Special Priced Catalog on request."

Member: Associated Equipment Distributors

EDWARD R. BACON COMPANY

INCORPORATED
CONSTRUCTION EQUIPMENT

Pasadena at 17th St. San Francisco
Acme Gasoline Rollers Jaeger Concrete Mixers
Adams "Leaning Mead Morrison Grah
Wheel" Graders Buckets and Hoists
Ord Concrete Road Taylor "Bulldog"
Finishers Gyrating Crushers
Barnes Road Pumps Whitecomb Locomotives
Burch Stone Spreaders Pioneer Back-Dump
Byers Cranes and Buckets
Truckcranes McKiernan-Terry Pile
Multifoote Road Pavers Hammers
Hereules Power Units Easton Industrial Cars
Oakland Sacramento Fresno

Member: Associated Equipment Distributors

ENGINEERING PRODUCTS CO.

RIALTO BUILDING SAN FRANCISCO

Representing

Easton Car & Construction Co.
Industrial, Quarry and Contractors'

CARS AND TRACK

Seattle Frog & Switch Co.

Manufacturing

RAIL — FROGS — SWITCHES
TRACK MATERIALS

Brown, Fraser & Co., Ltd.

Vancouver British Columbia, Can.

Equipment for

Contractors, Loggers, Municipalities,
Mines, Railroads and
Industrial Plants

Representing

Russell Road Machinery - Cletrac Tractors

LONDON CONCRETE MACHINERY CO. LTD.

LONDON, CANADA

Representing:

Aurora Centrifugal Pumps,
Humphrey High Pressure Pumps,
Novo Gasoline Engines,
Archer Tower Equipment.
Concrete Mixers,
Hoisting Engines,
Concrete Block Machines,
Cement Brick Machines.

Everything for the Contractor.

THE BURNITE MACHINERY CO., Inc.

518 BOSTON BLDG. DENVER, COLO.

Representing

T. L. Smith Company, Concrete Mixers and Pavers
Smith Engineering Works, Crushers and Screening Plants
Parsons Co., Trench Excavators and Backfillers
Union Iron Works, Pile Drivers and Grout Mixers
Mead-Morrison Co., Hoists and Tractors
Orion Crane & Shovel Co., Locomotive Cranes, Truck Cranes and Buckets
Gee, Heine Mfg. Co., Truck Loaders and Conveyors
Archer Iron Works, Concrete Chuting Equipment
Barnes Mfg. Co., Portable Pumps and Compressors
Northwest Engr. Co., Crawler Cranes, Shovels and Draglines
Elgin Sales Corp., Elgin Pickup Street Sweepers
Leach Company, Portable Saw Rigs
Erie City Iron Works, Boilers, Engines, Coal Pulverizers
Wheeler Condenser & Engr. Co., Condensers and Cooling Towers
The Permutit Co., Water Softeners and Filters
The Foto Co., Turbine Tube Cleaners
Spencer Turbine Co., Turbo Blowers and Central Cleaning Plants
Kimball Bros. Co., Passenger and Freight Elevators

Clinton and Held Co.

Distributors

1501-1511 Wazee St., Denver, Colo.

Caterpillar Tractors
Stockland Road Machinery Company—Graders
Union Iron Works—Snow-plows
Ransome Concrete Machinery Co.—Mixers and Pavers
La Plant-Choate Mfg. Co.—Trailers
Baker Mfg. Co.—Scrapers
Killefer Mfg. Co.—Rotary Scrapers
Austin Machinery Corp.—Trenchers

H. W. Moore Equipment Company

Construction Machinery

Fordson Power Equipment

Earth Handling and Road Building Machinery

Sixth and Acema Streets, Denver, Colorado

Gallon Iron Wks. & Mfg. Co. The Mundle Manufacturing Co
Lakewood Engineering Co. Ward Plow Co.
Jaeger Machine Co. Sagen Derrick Co.
Bay City Dredge Works The Heltzel Steel Form & Iron
Marion Steam Shovel Co. Co.
Barnes Manufacturing Co. National Hoisting Engine Co.
Gee, D. Whitcomb Co. Universal Crane Co.
Herodine Manufacturing Co.

Member of Associated Equipment Distributors

THE HERBERT N. STEINBARGER CO.

CONSTRUCTION EQUIPMENT
 1640-1646 Wazee St., Denver, Colo.

DISTRIBUTORS

Burnite Steam, Gas and Electric Shovels and Draglines
Vulcan Steam and Gasoline Locomotives
Owen Class Shell Buckets
Clyde Hoists and Derricks
Russell Graders, Scrapers, Gravel Handling Equipment
Sauerman Power Scrapers, Cableway Excavators
Stephens-Adamsen Gravel Washing Screens, Conveyors
Domestic Pumps and Air Compressors
Ree Concrete Pavers, Building Mixers
Stewart Tilting Concrete Mixers
Glystone Plaster and Mortar Mixers
Symons Column Clamps, Adjustable Shores
Buffalo-Springfield Steam and Gasoline Rollers
Evinrude Centrifugal and Pressure Pumps
Archer Concrete Distributing Systems
Anchor Concrete Block and Brick Machines
Other Accessory Lines
Member: Associated Equipment Distributors

Wilson Machinery Company*Construction Machinery*

1936 Market Street

Denver, Colorado

Representing

Archer Iron Wks.	Construction Mch. Co.
Austin-Western Road Machinery Co.	Heil Co.
Barber-Greene Co.	Heisler Locomotive Co.
Buckeye Traction	Koehring Co.
Ditcher Co.	Marshall-Wells Co.
Butler Bin Co.	Mundy Hoist Eng. Co.
Byers Machine Co.	Page Engineering Co.
C. H. & E. Mfg. Co.	Waukesha Motor Co.
Cleveland Wheelbarrow Co.	Western Wheel Scraper Co.
	G. H. Williams Co.

Stanley & Gill Machinery Co.760 West Bay Street
JACKSONVILLE, FLA.**REPRESENTING:**

VENN-SEVERIN MACHINE CO.—Semi-Diesel Oil Engines
DOMESTIC ENG. & PUMP CO.—Pumps, Hoists
PENNSYLVANIA CRUSHER CO.—Steel Roll Rock Crushers
F. E. MYERS & SONS.—Bulldozer Pumps
INGERSOLL-RAND, INC.—Compressors and Rock Drilling Equipment
WESTINGHOUSE ELECTRIC & MFG. CO.—Generators and Motors
RANSOME CONCRETE MIXERS
ELECTRIC LIGHT, WATER and ICE PLANT INSTALLATION

LARGE STOCKS CARRIED IN JACKSONVILLE

The K. B. NOBLE CO.C
O
N
N
E
C
T
I
C
U
T**REPRESENTING AMONG OTHERS**

RUSSELL: Graders
EASTON: Industrial Equipment.
HAISS: Loaders, Conveyors.
LEROI: Power Units.
"MASTER": Woodworkers.
NATIONAL: Hoists.
OWEN: Clamshell Buckets
PULSOMETER: Steam Pumps.
"REX": Mixers, Pavers.
SASGEN: Derricks.
JONES: Super Woodworkers
SULLIVAN: Compressors, Drills.
UNIVERSAL: Crushers, Bins, Etc.
BOX: Electric Hoists.
"SUPERIOR": Saw Rigs.
"HERCULES": Engines.

M
A
S
S
A
C
H
U
S
E
T
T
S

Member: Associated Equipment Distributors.

HARTFORD, CONNECTICUT**BURRESS-CLARK MACHINERY CO.**

Tampa, Florida

EXCLUSIVE DISTRIBUTORS FOR:

Chain-Belt Co., Rex Mixers
Street Bros. Gas, Steam & Electric Hoists
Barnes Mfg. Co., Power Pumps
Ingersoll-Rand Air Compressors
Lakewood Engine Co., Chuting Equipment
H. W. Roos Co., Rooshors
Jones Superior Saw Rigs
Metal Forms Corp., Metaforms
Sasgen Derricks, Winches, etc.
Blystone Mfg. Co., Plaster & Batch Mixers

COMPLETE STOCK IN TAMPA

Member: Associated Equipment Distributors

MCDONALD & BURGMANJacksonville, Daytona, West Palm Beach, Miami,
Florida**Distributors of Dependable Machinery**

"Caterpillar" Tractors
Austin Western Road Machinery
Erie Gas-Air and Steam Shovels
Universal Cranes
Plymouth Locomotives
Williams Clamshell Buckets
La Plant-Chaste Tractor trailers & Bulldozers
Bonney Loaders
Iowa Crushing & Screening Plants
D-A Lubricant for Tractors

If it's dirt moving equipment you need, we can furnish it from stock.

Member: Associated Equipment Distributors

**Cannon and Ashmead****Office**

109 Water Street

Warehouse

N. Rome Ave. and Chestnut St.

TAMPA, FLORIDA

Contractors' Equipment—Concrete Products—Machinery

"Burch" Spreaders, Car Unloaders

"O. K." Hoists, Compressors

"Union" Woodworkers

"Atlas" Shores

"Butler" Bins

Office Phones
4944-4945-4027Warehouse Phone
61743**FRED A. LONG**

223 Graham Bldg., Jacksonville, Florida

Distributor

LEACH MIXERS and PAVERS
HELTZEL STEEL FORMS
BARNES PUMPS
NORTHERN CONVEYORS
ACME ROAD MACHINERY
IDEAL CONCRETE BLOCK MACHINERY
"OK" HOISTS
FULLER-JOHNSON ENGINES

Stock Carried in Jacksonville

EDGAR ALEXANDER

905-B Fourth National Bank Bldg., Atlanta, Ga., Representing

The T. L. Smith Co., Concrete Mixers and Pavers

Orton Crane & Shovel Co., Cranes, Excavators, Shovels.

Jones Superior Woodworker, Saw Equipment.

Universal Road Machinery Co., Reliance Crushers, Street Sweep-

ers, Oilers, Car Unloaders, etc.

Heltzel Steel Form & Iron Co., Steel Forms for concrete work.

Buffalo-Springfield Roller Co., Kelly-Springfield Rollers.

Littleford Brothers, Littleford Tar and Asphalt Hoppers.

George Haise Mfg. Co., Trunk Loaders, Portable Belt Conveyors, etc.

Archer Iron Works, Concrete Mixers and Cuts.

Bay City Dredge Works, Motor Cranes, "One-Man Excavators."

Climax Engineering Co., Internal Combustion Engines.

Beach Manufacturing Co., Saw Tables.

Kemper Insulator Co., Insulators for Residences, Apartment

Houses and Public Institutions.

Blystone Manufacturing Co., Batch Mixers, General Product

Plant Equipment, etc.

M. & M. Form Clamp Co., Column Clamps

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

R. S. ARMSTRONG & BRO. CO.

676 Marietta St. Atlanta, Ga.

New Equipment in Stock

Chicago Air Compressors
Hercules Gasoline Engines
LeRoi Gasoline Engines
Jaeger Concrete Mixers
Knickerbocker Concrete Mixers
Lidgerwood Hoists
Strodsburg Hoists
Lookout Vertical Boilers
Bar Benders, Bar Cutters, Hoist Tower Outfits,
Pumps, Saw Rigs, etc.

Large stock of rebuilt machinery**RENTAL SERVICE****"YOU CAN GET IT AT ARMSTRONG'S"****A. B. MOORE, JR.**

Arcade Bldg.

Savannah, Ga.

REPRESENTING

Lakewood Engineering Company
Heltzel Steel Form & Iron Co.
Easton Car & Construction Co.
Barber-Greene Company
Northwest Engineering Co.
Buffalo Springfield Roller Co.
Domestic Engine & Pump Co.
Sterling Wheelbarrows
Wyoming Shovels
Automatic Signal & Sign Co.
Redflex Warning Signals Co.

EVERYTHING**IN CONTRACTORS' EQUIPMENT****W. E. AUSTIN MACHINERY COMPANY**

128 Marietta St., Atlanta, Ga.

Contractors' Machinery

for the building of

**HIGHWAY, RAILWAY, MINE, QUARRY,
AND GENERAL CONSTRUCTION WORK****REPRESENTING**

Allis-Chalmers Mfg. Co.	Huber Mfg. Co.
Inslay Mfg. Co.	Kent Machine Co.
National Hoist. Eng. Co.	Anchor Concrete Mch.
AUSCO Concrete Mixers	Co.
Fate-Roth-Heath Co.	Saggen Derrick Co.

Member: Associated Equipment Distributors

DOLAN—TUCKER—SMITH**Equipment and Supply Co.****REPRESENTING:**

McMyler Interstate Co.
International Clay Mch. Co.
Hear Shovel Co.
Cars
Cranes
Shovels
Drag Lines
Pavers
Halls

723-4 Monadnock Bldg., Chicago

N. A. COULTER**Equipment for Contractors and
Road Builders****24-26 Stewart Avenue
ATLANTA, GA.****Branch Offices and Warehouses**

Jacksonville, Fla.	West Palm Beach, Fla.
Tampa, Fla.	Miami, Fla.

Representing

Koehring Co.	Blaw-Knox Co.
Barber-Greene Co.	C. H. & E. Mfg. Co.

Dravo Equipment Company

611 Fulton St.

Chicago

REPRESENTING:

Marsh Capron Concrete Mixers
Kwik-Mix Tilting Mixers
Johnson Bins and Hoppers
Red Star Wheelbarrows and Carts
Barnes Pumping Units
Superior Saw Rigs
Sidney Scrapers
Rope, Shovels, Tools
Acroll Heaters and Torches
Mead-Morrison Hoists, Cranes and
Buckets
LeRoi Engines

YANCEY BROTHERS

550-556 Whitehall St. Atlanta, Ga.

"Caterpillar" Tractors	La Plant-Choate Tractor Dump
Adams Graders	Wagons, Scrapers & Bull-
Baker Manay Self-Loading Four	dozers
Wheel Scrapers	P & H Shovels & Cranes
Wheel and Drag Scrapers	Ord Conc. Finishing Machines
Red Edge Shovels	McKiernan-Terry Pile Ham-
Dump Wagons & Trailers	mers, etc.
Red Star Wheelbarrows	Killifer Road Rippers, Rotary
Contractors Plovers	Scrapers
Waukesha & LeRoi Engines	Barnes Pumps
Koppel Cars & Trunk	Mundy Hoists
Freeman Truck Turntables	Williams Clamshell Buckets
Hvass Street Flushers, Sweep-	Vulcan Industrial Locomotives
ers and Asphalt Plants	Acme Rollers & Crushers
Rex Concrete Mixers & Pavers	Hetchkins Steel Forms
Supplies, Tents, Bunks, etc.	Johnson Material Bins & Hoppers
	Schramm Air Compressors

MEMBER ASSOCIATED EQUIPMENT DISTRIBUTORS**ENGINEERING PRODUCTS COMPANY**

Arthur Prausnitz, Pres. Carl J. Gregersen, Secy.

Peoples Gas Bldg., Chicago, Ill.**RAILS — FROGS — SWITCHES
TRACK — MATERIALS
RAIL BENDERS, etc.****REPRESENTING**

EASTON Car & Construction Co.
Industrial — Quarry and Constructor's CARS.

Highway Trailer Company

Two- and Four-wheeled Trailers, one- to twenty-ton capacity.

R. H. HYLAND CO.

221-225 W. Huron St.
Chicago, Ill.

We carry in stock:

Leach Concrete Mixers and Saw Rigs
McKiernan-Terry Pile Hammers
Insley Steel Towers and Chutes
Norton Ball Bearing Jacks
Wyoming "Red Edge" Shovels
Erie Clam Shell Buckets
Clyde Hoisting Engines
Barnes Pumping Outfits
Sullivan Air Compressors
M & M Form Clamps

Member Associated Equipment Distributors

E. W. JOHNS EQUIPMENT COMPANY

1205 First National Bank Bldg.
FORT WAYNE, IND.

NORTHERN INDIANA DISTRIBUTORS
Representing

American Cement Machinery Co.
Bose Tilting and Non Tilting Mixers, Hoists
and Pavers.
Byers Machine Co.
Bear Cat Cranes and Excavators, Truckcranes,
Full Revolving Cranes.
Blystone Manufacturing Co.
Cement Products Plant Equipment Plaster
Mixers.
F. H. Myers & Bro. Co.
Bull Doser Pumps.
Derricks Gas Engines Saw Rigs

W. B. LOUER COMPANY

Construction Equipment

1512 S. Michigan Ave. Chicago, Illinois

Barnes High Pressure Road Pumps.
Berg Concrete Surfacing Machines.
"Caterpillar" Tractors.
Hercules Power Units.
Knickerbocker Concrete Mixers, Mortar Mixers
and Saw Rigs.
LaPlant-Choate Steel Dump Wagons, Plows,
Scrapers, Bulldozers, etc.
LeROI Gasoline Engines.
MultiFoot Paving Mixers.
National Hoisting Engines.
Owen Clam-Shell Buckets.
Archer's Hoist Tower Outfits.
Phonics, Michigan 1130-1131. Send for Catalogue.
Member: Associated Equipment Distributors.

GEO. W. FIFE EQUIPMENT CO.

1612 Merchants Bank Bldg.
INDIANAPOLIS, IND.

State Representative

T. L. SMITH CO.
Tilting and Non-tilting Concrete Mixers and
Road Pavers.
INSLEY MANUFACTURING CO.
Concrete Chuting Plants, Steel Derricks, and
Excavators.
CHICAGO AUTOMATIC CONVEYOR CO.
Conveyors.
MEAD-MORRISON MFG. CO.
Hoisting Engines, Clam-Shell Buckets.
ELGIN SALES CORP.
Street Cleaning Equipment.

SUPERIOR SUPPLY COMPANY

327 SOUTH LA SALLE STREET, CHICAGO

DISTRIBUTORS

Novo Engine Company	Metal Forms Corporation
Chain Bolt Company	Freeman Manufacturing Co.
Butler Equipment Company	Milwaukee Locomotive Man-
Bain Wagon Company	ufacturing Company
The Huber Manufacturing	Orion Crane & Shovel Co.
Company	G. H. Williams Company

A Complete Line of Construction Tools
and Equipment Carried in Chicago.

TELEPHONE HARRISON 7616

Knox Engineering and Equipment Co.

Road Building Machinery and Contractors' Sup-
plies, Car Loaders and Unloaders, Cranes, Hoists
and Boilers.

207-208 Empire Life Building, Indianapolis, Ind.

REPRESENTING

Smith Engineering Works
Bay City Dredge Works
Ideal Concrete Mch. Co.
Jeffrey Mfg. Co.
Evinrude Motor Co.
Orr & Semberow, Inc.
Koppel Car Works
Advance Foundry Co.
Deister Concentrator Co.
Carr Fastener Company
(DOT LUBRICATOR)

Western Contractors Supply Co.

14 No. Clinton St. Chicago

Distributors

Domestic Engine & Pump Co.
Pumps, Hoists, Engines, Air Com-
pressors.

Ward Plow Co.
Contractors' Plows.

Haggard & Marcusson Co.
Camp Bunks, Cots.

Complete Equipment and Supplies

Member: Associated Equipment Distributors

GIERKE-ROBINSON COMPANY

Distributors of Contractors' Equipment

Suite 306, Kahl Bldg.,

DAVENPORT,

IOWA

SMITH—Concrete Mixers and Pavers.

AUSTIN—Trenching Machines, Back-Mixers.

BLAW-KNOX—Steel Road Curb Gutter Forms, Steel Storage
Bins, Batching, Clam Shell Buckets, Truck Turntables.

CLYDE—Gasoline Builders Hoists, Steam Hoists, Derricks.

BARNES—Triplex and Quadruplex Road Builders Pumps.

ORD—Concrete Road Surfacers.

Wheelbarrows, Slips, Wheel Scrapers, Fronts, Gas and Steam
Rollers, Rock Crushers, Graders, Wire Rope, Hoses, NORTH-
WEST Cranes, Power Shovels and Draglines, SULLIVAN Air
Compressors, Air Tools, etc.

THOMAS L. BARRET

Contractors' Equipment
LOUISVILLE, KY.

BEY Mixers and Pavers.
KENNEDY Gearless Crushers.
WILLIAMS Clam Shell Buckets.
ARMSTRONG Blast Hole Drills.
HAISS Material Handling Equipment and Loaders.
MUNDY Hoisting Equipment.
RUSSELL Road Equipment.
UNION Hammers and Concrete Buckets.
TRIANGLE and Welded Mesh.
CORRUGATED Bars.
BARRET Asphalt Expansion Joint.
VULCAN IRON WKS. Steam & Gas Locomotives.
JOHNSON Bins and Hoppers.
HUG Trucks, Turntables and Subgraders.
METAFORM Road Rail, Etc.

OLE K. OLSEN

822 Perdido St. New Orleans

REPRESENTING:

Ransome Gen. Mach. Co.	Ralph B. Carter Co.
McKiernan-Terry Drill Co.	Atlanta & Atlantic Terra Cotta Co.
Amer. Cement Mach. Co.	Wyoming Shovel Works
American Saw Mill Mach. Co.	Blaw-Knox Co.
National Hoisting Eng. Co.	Patent Scaffolding Co.
Northwestern Expanded Metal Co.	Universal Form Clamp Co.
Concrete Steel Co.	Atlas Engineering Co.
Truscon Laboratories	Blystone Mfg. Co.
Dahlstrom Metallic Door Co.	LeROI Co.
Campbell Metal Window Corp.	Cleveland Wheelbarrow Co.
Price Evans Foundry Co.	H. W. Ross Co.
Member: Associated Equipment Distributors	Amer. Steel & Wire Co.

Brandels Machinery & Supply Co.

325 W. Main St., Louisville, Ky.

Representing:

J. D. Adams & Co.	Ingersoll-Rand Co.
Barber-Greene Co.	Inley Mfg. Co.
Beach Manufacturing Co.	LeROI Co.
Blaw-Knox Co.	A. Lechen & Sons Rope Co.
Buffalo-Springfield Roller Co.	McKiernan-Terry Drill Co.
A. S. Cameron Steam Pump Works.	Saugen Derrick Co.
Climax Engineering Co.	Sawman Bros.
Domestic Engine & Pump Co.	T. L. Smith Co.
Erie Steam Shovel Co.	Smith Engineering Works
A. B. Farquhar Co.	Sterling Wheelbarrow Co.
A. W. French & Co.	Clyde Iron Works
Fate-Root-Heath Co.	Watson Truck Corporation
	Western Wheeled Scraper Co.

Member: Associated Equipment Distributors

Southern States Equipment Co., Inc.

718 Canal Commercial Building

NEW ORLEANS

"Erie" Steam Shovels
"Parsons" Trench Excavators and Backfillers
"Telsmith" Sand and Gravel Plants
"Williams" Clam Shell Buckets
"Orz & Sambower" Hoisting Engines, Boilers and Concrete Mixers
"Foote" Paving Mixers
"Archer" Concrete Chuting
"Domestic" Pumps and Engines
"Union" Pile Hammers
"Koppel" Industrial Cars and Track

EVERYTHING FOR THE CONTRACTOR

ROY C. WHAYNE SUPPLY CO.

Opposite City Hall—608 W. Jefferson St.

LOUISVILLE, KY.

Best and Holt "Caterpillar" Tractors
Koehring Shovels, Cranes, Pavers
Jaeger Concrete Mixers
Heltzel Steel Forms
Byers "Bear Cat" Excavator
Stockland Road Graders
Barnes Pumps
Sullivan Compressors, Drills, etc.
Flory Hoists, Cableways, etc.

CONSTRUCTION EQUIPMENT OF ALL KINDS

Member: Associated Equipment Distributors

DIXIE MACHINERY CO.

1561-3 Texas Avenue, Shreveport, La.

WE HANDLE AND CAN MAKE PROMPT
SHIPMENT ON:

Lakewood Engineering Company's—Concrete Pavers, Mixers, Towers, Etc.
Northwest Engineering Company's—Shovels and Cranes.
Sawman Company's—Gravel Pit Equipment, Drag Line, etc.
Mundy Hoisting Equipment—Hoisting Engines
Dixie—Portable Tie and Saw Mills
Southern Engine & Boiler Works—Engines and Boilers
Patton Builders Hoists
C. & J. Iron Lathes.
Soud Rotary and Twin Engines.
Completes Irrigating Pumping Outfits.

THE CLYDE COMPANY, INC.

NEW ORLEANS, LA.

Office and Warehouse—309 Magazine St.

Beach Mfg. Co., Contractors' Saw Rigs	Wood Shovel & Tool Co., Mo-lyddrum Shovels
Clyde Iron Works Sales Co., Hoisting Engines, Derriks, etc.	Universal Crane Co., Truck Cranes
Lakewood Eng. Co., Concrete Mixers, Pavers and Plant equipment	Construction Machinery Co., Wonder Concrete Mixers
Northwest Eng. Co., Crawler Convertible Machines	Roco-Meyer-Hecht Co., Atlas Adjustable Shores
Ohio Locomotive Crane Co., Loco. Cranes	Erie Steel Constr. Co., Steel Bins and Aggregators
Sawman Bros., Cableway Excavating Machinery	M. & M. Form Clamp Company, Form and Column Clamps
Sterling Wheelbarrow Co., Wheelbarrows	Freeman Mfg. Co., Turntables
Barnes Mfg. Co., Power Pumps	Barber-Greene Company, Conveyors, Loaders and Ditchers
	Sullivan Machinery Company, Air Compressors

Members: Associated Equipment Distributors

THOS. M. BROWN

106 So. Gay St. Baltimore, Md.

REPRESENTING

Koehring Company
Concrete pavers, mixers, cranes and shovels.
Heltzel Steel Form & Iron Company
Road forms.
J. D. Adams & Company
Leaning Wheel Graders.
Construction Machinery Co.
Wonder mixers, hoists and backfillers.
Keystone Driller Company
Shovels.
Huber Manufacturing Company
Gasoline rollers.
O. D. G. Company
Clamps and shores.

JOHN C. LOUIS

221 S. Eutaw St. Baltimore, Md.

REPRESENTING

Jaeger Machine Co.
 Barnes Manufacturing Co.
 Ideal Concrete Machinery Co.
 National Hoisting Engine Co.
 American Cable Co.
 The Foote Co.
 Wheeling Corrugating Co.
 Good Roads Machinery Co.
 Littleford Brothers
 Hotchkiss Steel Products Co.
 Jones Superior Machine Co.
 Cyclone Fence Co.

MEMBER: Associated Equipment Distributors

C. R. DODGE COMPANY

141 Milk St. Boston, Mass.

Representing

Koehring Company
 Russell Grader Mfg. Co.
 Heltzel Steel Form & Iron Co.
 Butler Bin Co.
 National Hoisting Engine Co.
 Littleford Brothers
 Cement Block Machinery Co.
 Kwik-Mix Concrete Mixer Co.

THE HENRY H. MEYER CO.

110 S. Howard St. Baltimore, Md.

REPRESENTING:

Austin Western Road Mach.
 Co.
 Blaw-Knox Co.
 Boston & Luskport Blunk Co.
 C. H. & E. Manufacturing Co.
 Chain Belt Company,
 Connors & Company,
 E. I. du Pont de Nemours Co.,
 Inc.
 Duff Mfg. Co.
 The Harrington Co.
 Insley Manufacturing Co.
 A. Leach & Sons Rope Co.
 Lidgerwood Manufacturing Co.
 Nova Engine Co.
 Parsons Co.
 Pulameter Steam Pump Co.
 Sterling Wheelbarrow Co.
 Tompkins-Kendy Co.
 Universal Crane Co.
 Universal Road Machinery Co.

MEMBER OF ASSOCIATED EQUIPMENT DISTRIBUTORS.

HEDGE & MATTHEIS CO.The Equipment House for Contractors
Fifty Dorchester Avenue, Boston, Mass.**REPRESENTING**

Jaeger Machine Company
 Marsh-Capron Company
 Lawrence Pump and Engine Co.
 Mead-Morrison Manufacturing Company
 McKiernan-Terry Drill Co.
 Lakewood Engineering Co.
 Ingersoll-Rand Co.
 A. Leach & Sons Rope Co.
 Anchor Concrete Machinery Company
 Handy Sack Baler Company
 Blystone Manufacturing Company
 Barber-Greene Company
 Mills Manufacturing Company
 The Wood Shovel and Tool Co.
 C. H. & E. Manufacturing Co.
 Hotchkiss Steel Products Co.
 Member: Associated Equipment Distributors

**ABERTHAW COMPANY
EQUIPMENT DIVISION**

133 Southampton St., Boston, Mass.

REPRESENTING

FLORY Hoists & Derricks
 LEACH Concrete Mixers and Saw Rigs
 HAISS Loaders and Conveyors
 SCHRAMM Compressors
 WILLIAMS Clam Shell Buckets
 CLYDE Derrick Fittings
 U. S. STANDARD Concrete Block Machinery
 CARTER Open and Closed Discharge Diaphragm
 Pumps

EQUIPMENT FOR SALE AND RENT

P. I. Perkins Company

110 High St., Boston, Mass.

**Mechanical Equipment for Power Plants,
Contractors, Industrial Plants**

Byers Bearcat Cranes
 Mundy Moistening Equipment
 Dobbie Derricks and Fittings
 Blaw-Knox Buckets, Road Forms, etc.
 Pioneer Slackline Excavators

THE BOND CO.

84 HIGH STREET, BOSTON

Contractors' Tools and Equipment**Representing**

"SMITH" Mixers and Pavers
 "NORTHWEST" Cranes,
 Shovels and Drag Lines.
 "CHICAGO" Portable Con-
 veyors.
 "RED STAR" Barrows and
 Concrete Carts.
 "ESSICK" Plaster Mixers.
 "INSLEY" Excavators and
 Concrete Placing Equip.
 JONES "SUPERIOR" Wood-
 workers.
 "SASGEN" Derricks.
 "NOVO" Gasoline Engines,
 Pumps and Hoists.
 "MONARCH" Block Ma-
 chines.
 "SYNTRON" Electric Ham-
 mers.
 BLACK & DECKER" Drills.

M. B. Tyler Company

1016 So. Main St. Springfield, Mass.

Representing

Best & Holt "Caterpillar" Tractors.
 Austin-Western Road Machinery.
 Johnson Demountable Charging Bins.
 LaPlant-Choate and Sargent Snow Plows.
 Portable Air Compressors and Con-
 tractors' Equipment.

**W. H. ANDERSON TOOL
AND SUPPLY CO.**

2178 Franklin St. Detroit, Michigan

Representing

McKernan-Terry steam hammers
Davenport locomotives
Ransome mixers, pavers and chuting equipment
Novo gasoline engines, hoists and pumping outfits
Spender shovels, cranes
Conneaut shovels and scoops
Sidney wheelbarrows and scrapers
Monarch tractors
Sargent snow plows
Haisa loaders and material handling equipment
Johnson—bins and batch measuring hoppers

WETTLAUER BROS.

Glendale 5689

2028 Michigan Avenue.

DETROIT, MICH.

Michigan Distributors for

AMERICAN CEMENT MACHINE CO.,
BOSS MIXER, any size

CONSTRUCTION MACHINERY COMPANY
WONDER MIXERS, HOISTS and PUMPS

ORR & SEMBOWER
HOIST, GASOLINE, STEAM OR ELECTRIC
EVINRUDE CENTRIFUGAL PUMPS
BLOCK MACHINE EQUIPMENT

**CONTRACTOR'S EQUIPMENT
COMPANY, Inc.**

5169 Martin Ave.

DETROIT

Representing:

CATERPILLAR Tractors.
REX Mixers and Pavers.
ERIE Shovels and Cranes.
DOMESTIC Pumps and Compressors.
ERIE Clamshell Buckets.
SARGEN Derricks and Winches.
MILWAUKEE Gasoline Locomotives.
Steam & Gas Hoists, Conveyors, Wheelbarrows,
Shovels, etc.

Member: Associated Equipment Distributors

Wolverine Concrete Machinery Co.

2421 Buchanan St., Detroit, Michigan

REPRESENTING

LEACH-OSHKOSH..... Mixers and Pavers
SULLIVAN..... Air Compressors
HUMPHRIES..... Pumps
MASTERTROWEL..... Long-Handled Finishers
CHASE..... Industrial Cars
BLYSTONE..... Plaster Mixers
ELEVATORS..... Of All Types
KENT..... Continuous Mixers
MILES..... Cement Block Machines
ROCKTILE..... Automatic Units
CEMENT PRODUCTS PLANT MACHINERY
GENERAL CONTRACTORS' EQUIPMENT

J. W. DOPP & CO.**CONTRACTORS EQUIPMENT**

2937 East Grand Boulevard, DETROIT, MICH.

Factory Representatives and Warehouse for
Sterling Wheelbarrow Co.—Wheelbarrows,
Carts, Etc.

T. L. Smith—Pavers,
Mixers, Excavators.

A. Leschen & Sons
Rope Co.—Hercules
"Red Strand" Wire
Rope.

Jones Superior Ma-
chine Co.—Saw Rigs.

Phone, Empire 3685

Member: Associated Equipment Distributors

Inley Mfg. Co.—In-
dustrial and Concrete
Distributing Equip-
ment.

Mead-Morrison Mfg.
Co.—Hoisting En-
gines—Steam, Gas,
Electric.

Wyoming Shovel
Works—Red Edge
Shovels, Scoops, and
Picks.

KELLOGG-BURLINGAME CO.

67 Market Ave. N. W.

Grand Rapids, Mich.

Representing:

Rex Building Mixers and Pavers
Novo Gasoline Engines, Hoists, Pumping Outfits
M & M Form Clamp Co.
Novo Drag-line Hoists
Northwest Cranes
Clyde Steam Hoists
Huber Motor Road Rollers and Maintainers
Freeman Truck Turntables
Myers Bulldozer Pumps
Centrifugal Pumps, Diaphragm Pumps
Scrapers, Wheelbarrows, etc.
Atlas Adjustable Shores
Heisler Locomotives
Archer Iron Works—Twoers and Spouting Equip-
ment

Member: Associated Equipment Distributors.

Good Roads Supply CompanyMaterial and Machinery for
Roads and Streets

1409 Ford Building, Detroit, Michigan

American Gas Accumulator Co.

National Hoisting Engine Co.

Koehring Co.

Blaw-Knox Co.

Acme Road Machinery Co.

C. H. & E. Mfg. Co.

Automatic Sign & Signal Co.

Barber-Greene Co.

Archer Iron Works

Universal Crane Co.

F. D. LAKE COMPANY

Contractors' Machinery and Tools

16 Campau Ave. N. W. near Fulton

GRAND RAPIDS, MICHIGAN

Representing

T. L. Smith Co.—Concrete Mixers and Pavers
C. H. & E. Mfg. Co.—Portable Saw Rigs and
Pumps
Smith Engineering Works—Gravel Washing and
Rock Crushing Machinery
Northern Conveyor Mfg. Co.—Portable Conveyors
George Haisa Mfg. Co.—Creeper Loading Equip-
ment
A. Leschen & Sons—Wire and Manila Rope
Wood Shovel & Tool Co.—Mo-lyb-den-um Shovels.
Keystone Driller Co.—Drills and Excavators
Lidgerwood Mfg. Co.—Utility Gas Hoists

West Michigan Equipment Co.*Contractors' Tools and Machinery***69 Division Ave. S., Grand Rapids, Mich.****REPRESENTING**

Rommel Mfg. Co., Direct Drive Mixers
 Bay City Dredge Works, Excavators
 Domestic Pump & Engine Co., Air Compressors,
 Pumps, Hoists
 Orton Crane & Shovel Co., Cranes, Drag Lines,
 Shovels
 Sidney Steel Scrapers and Wheelbarrows
 Nelson Loaders
 A. Leichen & Sons, Wire & Manila Rope, Blocks
 Wood Shovel & Tool Co., Mo-lyb-den-am Shovels
 Sassgen Derricks
 Watson Wagon Works

Minnesota Equipment Co.**419 South Sixth Street****Minneapolis, Minn.***Northwest Distributors for*

LAKEWOOD Mixers, Spouting, Carts, Tampers,
 Screeds, Subgraders, Cars, Track
LIDGERWOOD Steam, Gasoline and Electric
 Hoists
THEW Steam, Gasoline Shovels and Cranes
MILWAUKEE Gasoline Locomotives
BAKER-MANEY Four-Wheel Self-Loading
 Scrapers
SCHRAMM Air Compressors
CLETRAC Crawler Tractors
KWIK-MIX Small Tilting Concrete Mixers

H. E. ERICKSON CO., Inc.**114 South Third St., Minneapolis, Minn.****CONTRACTORS' EQUIPMENT
AND SUPPLIES**

Bees Mixers.
 Stewart Mixers
 Sackett Spouting
 Saegon Derricks
 Kardong Clamps
 Elite Scaffold Brackets
 Austin Backfillers
 Austin Trench Machines
 Samson Hoists
 Beach Drag Buckets
 Puffer Hubbard Wheelbarrows
 Duff Trench Braces
 Cement Tools of all kinds
 Cement Sack Balers
 Cement Sack Cleaners
 Mandt Steel Dump Bodies
 Gravel Screens
 Mortar Mixers
 M. & M. Form Clamps
 Pumps
 Parks Saw Rigs

THORMAN W. RSHOLT COMPANY**300 Tenth Ave. South
Minneapolis, Minnesota****REPRESENTING**

Koehring Co. —Pavers, Mixers, Cranes
 C. H. & E. Mfg. Co. —Saw Rigs, Tractors,
 Pumps
 Metal Forms Corp. —Steel Forms
 Blystone Mfg. Co. —Mortar Mixers
 Emerson Mfg. Co. —Steam Pumps
 C. S. Johnson —Demountable Bins
 Hadfield-Penfield —One Man Graders
 The Trailmobile Co. —Trailers Dump Bodies
 Vulcan Iron Works —Steam & Gas Locomotives
 Mead-Morrison —Contractors' Equipment
 M & M Form Clamp Co. —Column Clamps
EVERYTHING FOR THE CONTRACTOR

WM. H. HALE & Co.**607 "Fifth" Avenue "South" Minneapolis, Minn.****REPRESENTING**

"WONDER"—Mixers, Hoists, "PAGE"—Drag Buckets
 Pumps "DAVENPORT"—Locomotives
 "RANSOME"—Mixers, Pav- "BEACH"—Saw Rigs
 ers, Mast Plants "SKELTON"—Bantam Shovels
 "CLYDE"—Steam Gasoline, "PUFFER-HUBBARD"—
 Electric Hoists and Derricks Wheelbarrows
 "P. & H."—Gasoline Shovels, "HAUCK"—Concrete Heaters
 Cranes, Backfillers, etc. "HANDY"—Sack Cleaners,
 "ERIE"—Clamshell Buckets, Balers
 Agrometer Bins "SASGEN"—Derricks, Winches
 "ALDRICH"—High Pressure "PAPKE"—Block Machines
 Road Pumps and Tampers

MEMBER: Associated Equipment Distributors

WM. H. ZIEGLER CO., Inc.*Contractors' Equipment***Minneapolis, Duluth, & St. Paul, Minn.**

Ord Concrete Road Finishers
 Box Mixers and Pavers
 Insley Towers and Chuting
 Barnes Pumps
 Plymouth Gasoline Locomotives
 Western Cars and Grading Equipment
 Williams Clamshell Buckets
 Sterling Wheelbarrows and Carts
 Wyoming Red Edge Shovels
 Caterpillar Tractors
 Erie Steam and Gas Shovel & Cranes
 Littleford Bros.
 Tar Heaters, Kettles, etc.
 Barber-Greene Co., Conveyors and Loaders
 Climax Trustworthy Engines
 LaPlant Choate, Tractor Trailers and Snow Plows
 Member: Associated Equipment Distributors.

MINNEAPOLIS EQUIPMENT CO.**520 Second Street, S. E. Minneapolis, Minn.****NORTHWEST DISTRIBUTORS for**

Archer Tower Outfits
 and Chuting
 Atlas Conveyors
 Baldwin Shovels and
 Scoops
 Byers Bear Cat Cranes
 and Truckcranes
 Humphries High
 Capacity Pumping
 Outfits
 Hotchkiss Steel Forms
 Ideal Concrete Prod.
 Machinery
 Jaeger Concrete Mix-
 ers and Placing
 Plants
 Leach Concrete Mixers
 and Saw Rigs
 J. S. Mundy Steam,
 Gas and Electric
 Hoists
 Multi-Foots Pavers
 and Trailers
 Nelson Form Tie and
 Spacers
 Pioneer Buckets and
 Cableway
 Red Star Carts and
 Wheelbarrows
 Williamsport Wire
 Rope

BORCHERT-INGERSOLL, Inc.**ST. PAUL, MINN.****DULUTH, MINN.****DISTRIBUTORS**

"Smith" Mixers and Pavers. "Parsons" Trench excavators
 "Blaw-Knox" Con. forms, clam- and backfillers.
 shell buckets & "Batcher" plants. "Universal" Truck cranes.
 "Northwest" Shovels & Cranes. "Stroud" Elevating graders and
 "Sanderson-Cyclone" Blast hole dump wagons.
 drills. "Whitcomb" Gasoline and elec-
 "Sullivan" Air Compressors, tric locomotives.
 Drills, etc. "Koppel" Industrial cars and
 "Domestic" Gasoline pumps track material.
 and hoists. "Hulse" Trunk loaders and por-
 "TeleSmith" Crushers, screens, table belt conveyors.
 and conveying machinery. "McKiernan-Terry" File han-
 "Sauerman" Cableway excava- mers and jacks.
 tors and power drag scrapers. "Nye" Steam pumps.
 "Monarch" Crawler Tractors

MEMBER: Associated Equipment Distributors

Clifford Waterhouse

Box 337

WEST JACKSON, MISS.

Distributor of

Stockland Quick Lift Graders
 Kwik Mix Concrete Mixers
 Calco Drainage Gates
 Armco Iron Culverts
 DuPont Explosives
 Red Strand Wire Rope
 Wyoming Red Edge Shovels

W. E. (BILL) HUGHES*Equipment for Contractors*

2045 Main Street, Kansas City, Missouri

Representing

KOEHRING COMPANY
 C. H. & E. MFG. COMPANY
 BLAW-KNOX COMPANY

E. A. MARTIN MACHINERY CO.

501-521 School St.

Joplin, Mo.

New and Rebuilt Rock Drills,
 Jack Hammer Drills, and Mount-
 ings, Jaw Crushers, Crushing
 Rolls, Screens and Screening
 Plants.

REPRESENTING:

Construction Mch. Co. Cleveland Wheelbarrow
 Miles Mfg. Co. Buckeye Machine Co.

G. C. KENNEY*Road Building Equipment*

402 N. Y. Life Bldg., Kansas City, Mo.

Phone, Main 3818

REPRESENTING:

Ord Concrete Road Finishers
 Smith Pavers
 O. & S. Cranes and Shovels
 Marsh-Capron Rail Track Mixers
 Speeder Cranes and Shovels
 Freeman Turntables
 Erie Bins and Buckets
 Barber-Greene Loaders
 Ideal Concrete Block Machines
 Galion Junior Rollers
 O K Hoists and Compressors

Bunting Hardware & Machinery Co.

810-814 Walnut Street, Kansas City, Mo.

T. L. Smith Company, Mixers.
 Smith Engineering Works, Crushers, Elevators
 and Screens.
 Nove Engine Co., Gas Engines, Saw Rigs and
 Pumps.
 Sullivan Compressors and Drills.
 Sterling Wheelbarrows.
 Smith & Sons Mfg. Co., Wheelers and Scrapers.
 Barber-Greene Conveyors and Loaders.
 Archer Bros., Concrete Buckets, Hoppers and
 Spouting.
 American Wire Rope.
 M & M Form Clamp Co.

Member Associated Equipment Distributors

O. B. AVERY CO.

1442 N. Broadway

St. Louis, Mo.

Contractors' Equipment and Supplies

REPRESENTING:

Austin Machinery Corporation
 Erie Steam Shovel Company
 Russell Grader Manufacturing Company
 Sullivan Machinery Company
 Koppel Industrial Car & Equipment Company
 Lendinghaus Wagon Co.
 The American Cement Machine Co.
 Cleveland Wheelbarrow Company
 G. H. Williams Co.
 S. Flory Mfg. Co.
 B. F. Goodrich Rubber Co.
 Jeffrey Mfg. Co.
 Union Iron Works, Inc.

Member: Associated Equipment Distributors

FUNKHOUSER EQUIPMENT CO.

2405 Jefferson Street

KANSAS CITY,

MISSOURI

Representing:

Lakewood Engineering Co.
 Northwest Engineering Co.
 Domestic Engine & Pump Co.
 Lidgerwood Mfg. Co.
 Jaeger Machine Co.
 Ideal Power Lawn Mower Co.
 Climax Engineering Co.
 McKiernan-Terry Drill Co.

LAWRENCE V. FRALEY

Buder Bldg., 707 Market St.,

St. Louis, Missouri

Barber-Greene Company
 The Fate-Root-Heath Company

*Standardised Material Handling and Road
Building Machinery*

Self-Feeding Bucket Loaders
 Standardized Portable Conveyors
 Standardised Permanent Conveyors
 B-G Trenching Machines
 PLYMOUTH Gasoline Locomotives
 Highway Trailers

S. T. Hatcher & Company

3665-67 Market St., St. Louis, Mo.

REPRESENTING

KNICKERBOCKER—Concrete Mixers, Mortar Mixers, Saw Rigs.
KIEL—Concrete Mixers, Diaphragm Pumps.
ARCHER IRON WORKS—Steel Tower Hoists, Concrete Chutes, Concrete Buckets.
PARKS—Woodworking Machines.
LE ROI—Gasoline Engines.

Tractor & Equipment Co., Inc.

BILLINGS

MONTANA

Construction, Municipal and Hauling Equipment**REPRESENTING**

Austin-Western Road Machinery Company	Wyoming Shovel Works
Western Wheeled Scraper Co.	Northwest Engineering Co.
Caterpillar Tractor Co.	Barnes Mfg. Co.
Marion Steam Shovel Co.	A. Leschen & Sons
Buckeye Traction Ditcher Co.	Chicago Pneumatic Tool Co.
Four Wheel Drive Auto Co.	Chain Belt Co.
Barber-Greene Company	Iowa Mfg. Co.
Blaw-Knox Company	National Hoisting Engine Co.
Sterling Wheelbarrow	Wood Hydraulic Hoist and Body Co.

Member: Associated Equipment Distributors

C. F. RABBEITT*Railway Exchange Bldg.***ST. LOUIS REPRESENTING: MISSOURI**

Aeroll Burner Co., Concrete Heaters, Thawing Torches
 Archer Iron Works, Spouting Equipment
 Blaw-Knox Co., Bins, Batchers-Plants, Road and Sidewalk Forms, Buckets
 Century Bag Cleaner Co., Cement Bag Cleaners
 C. H. & E. Mfg. Co., Saw Rigs, Pumps, Hoists, Mortar Mixers
 Construction Machinery Co., Tilting Drum Mixers
 Koehring Co., Pavers, Construction Mixers, Cranes, Shovels and Draglines
 Littleford Bros., Asphalt Heaters, Pouring Pots, Paving Tools
 Roos-Meyer-Hecht Co., Atlas Shores
 Sterling Wheelbarrow Co., Barrows, Carts
 A. W. French & Co., Ord Concrete Road Finishers
 Western Wheeled Scraper Co., Cars, Track.

Northwest Equipment Co. Inc.

Butte, Great Falls, Billings, Montana

Road Machinery and Contractors' Equipment**Representing****RUSSELL GRADER MFG. CO.**

Byers Bear Cats	Koehring Mixers and Pavers
Eucyrus Shovels	Rommel Mixers
Cleirac Tractors	Sterling Motor Trucks
A. W. Traffic Treads	Smith Eng. Works
Monarch Industrial Tractors	

*"Our Customer Must Be Satisfied"***THE GEO. F. SMITH COMPANY****REPRESENTING**

T. L. Smith Co.	Wyoming Shovel Works
Smith Engineering Works	Nye Steam Pump & Mfg. Co.
Sterling Wheelbarrow Co.	American Steel & Wire Co.
Insley Mfg. Co.	McKernan Terry Drill Co.
Coyde Iron Works	Hauk Mfg. Co.
Domestic Engine & Pump Co.	Continental Motors Corp.
Universal Crane Co.	Le Roi Company
Owen Bucket Co.	Cable Mfg. Co.
Sauerman Bros.	Templeton Kenly & Co.
Seagon Derrick Co.	

Franklin and Channing Aves., ST. LOUIS

Member: Associated Equipment Distributors

WESTERN SUPPLY COMPANY

802-812 East Iron St.

Butte, Montana

Broderick & Bascom Rope Co.
 R. & J. Dick Co., Inc.
 Erie Steam Shovel Co.
 Gardner Governor Company
 Goodyear Tire & Rubber Co.
 George Hais Mfg. Co.
 Heli Company
 Little Red Wagon Mfg. Co.
 Novo Engine Company
 Ransome Concrete Machinery Co.
 Templeton & Kenly Co., Ltd.
 Universal Road Machinery Co.
 Westinghouse Electric & Mfg. Co.

Member Associated Equipment Distributors.

TULLEY EQUIPMENT COMPANY*Contractors' and Industrial Equipment*

616-18 Buder Bldg.

St. Louis, Mo.

Representing

Orton Crane & Shovel Co., Cranes, Drag Lines and Buckets
 Chain Belt Company, Pavers and Building Mixers
 Barnes Pump Company, Contractors' Pumps
 Edston Car & Construction Company, Cars and Track
 Pioneer Bucket Co., Cableway Excavators
 Orr & Sombower, Gas Hoisting Engines, Boilers
 George Hais Mfg. Company, Wagon Loaders and Conveyors
 Heltzel Company, Sidewalk Construction Forms
 Zin-Ho Portable Air Compressors
 LeRoi Company, Gas Engines
 C. S. Johnson Company, Portable Bins and Hoppers
 Climax Engineering Company, Gas Engines
 Milwaukee Locomotive Manufacturing Co., Gasoline Locomotives
 Hug, Trucks, Sub-Graders

FUCHS EQUIPMENT COMPANY**OMAHA, NEB.****REPRESENTING:**

Smith Mixers and Pavers.	National Hoists.
Blaw-Knox Form, Buckets, Bins	Akron Wheelbarrows.
Barber-Greene Loaders, Conveyors.	Looschen Hercules Cable
M. & M. Form Clamps.	Atlas Shores.
F & H Cranes, Shovels, Drag-	Le Roi Engines
Ins.	Erie Gravel Pumps.
Ingersoll-Rand Compressors.	Twin City Engines.
Whitcomb Locomotives.	Waukena Engines.
Tal-Smith Crushers.	Woods Molybdenum Shovels.
Domestic Pumps, Hoists.	Ord Concrete Road Finishers
Barnes Pumps.	Du Pont Explosives

Member: Associated Equipment Distributors.

INTERSTATE Machinery and Supply Company OMAHA, NEB.

CLIMAX Trustworthy Engines
 REX Mixers and Pavers
 WONDER Mixers—Pumps—Hoists
 NOVO Hoists—Pumps—Saw Rigs
 HAISS Loaders
 NORTH WEST Cranes and Shovels
 RED-EDGE Shovels and Picks
 IDEAL Block Machines
 STERLING Wheelbarrows
 SAUERMAN Excavators and Scrapers
 WILLIAMS Buckets. AMERICAN Wire Rope
 METAFORM Forms. INDUSTRIAL Power Units
 LAKEWOOD Engr. Co. CHICAGO Aut. Conveyor
 SULLIVAN Mach. Co. Mining & Quarry Machinery
 Members: Associated Equipment Distributors.

J. I. BINGHAM

Contractors' Equipment

451 West Gray St. Elmira, N. Y.

Chicago Automatic Conveyor Co., Wagon Loaders and Conveyors
 General Fireproofing Building Products
 Hughes-Keenan Architectural & Ornamental Iron Works
 C. H. & E. Manufacturing Co.
 Hotchkiss Steel Products Co., Road, Curb and Sidewalk Forms
 Knapp Bros. Mfg. Co., Sanitary Metal Trim
 Master Builders Co., Products
 O. K. Clutch & Machinery Co., Air Compressors
 Wickwire Spencer Steel Co., Mesh Reinforcement

Did You Consult the
Classified Index
 On Pages 3 to 39?

GEORGE MALVESE & CO.

Jericho Turnpike, Near Nassau Blvd.

GARDEN CITY, NEW YORK

Representing:

Cietrac Crawler Tractors	Wiard Flows
Schaefer Automatic Scrapers	Domestic Pumps
Killefer Rotary Scrapers	Western Block Co. Blocks
Euclid Scrapers	Broderick & Bascom Wire Rope
Acme Road Machines	Ever-Ready Hydraulic Jacks
Oliver Flows	Woodhouse Chain

H. B. TREVOR COMPANY

Larkin Terminal Warehouse Bldg.

197 Van Rensselaer Street

Buffalo, N. Y.

REPRESENTING:

Koehring Company
 Insley Manufacturing Company
 Blaw-Knox
 Clyde Iron Works
 Barnes Manufacturing Company
 Beach Manufacturing Company
 McKiernan-Terry Drill Co.

GEORGE D. CASE

Engineer and Contractor

ROAD BUILDING EQUIPMENT

Horseheads, New York

Bell Phone 161

Representing

RUSSELL Road Machinery
 WATSON Wagons
 SCHRAMM Air Compressors
 WEARPROOF Signs
 GELSER Concrete Pipe
 MONARCH Tractors
 —"Steel Bridges"—"Wassau Snow Flows"—

THE WHEELER-MURRAY CO.

Construction and Industrial Equipment

335-337 Ellicott St.,
 Buffalo, N. Y.

Builders Exchange
 Rochester, N. Y.

REPRESENTING:

Ransome Pavers, Mixers, Towers and Chutes.
 Novo Engines, Hoists and Pumps.
 O & S Locomotive Cranes and Shovels.
 Erie Aggregators and Clamshell Buckets.
 National Hoists, Derricks, Pile Hammers.
 Sidney Wheelbarrows, Scrapers and Flows.
 Hotchkiss Steel Road, Curb and Sidewalk Forms.
 Richmond Screw Anchor Concrete Specialties.
 Atlas Adjustable Shores.
 Mead-Morrison Crawler Tractors.
 Walsh Steel Snow Flows.

DRAVO EQUIPMENT CO.

21-57 Borden Ave., Long Island City, N. Y.

REPRESENTING.

Marsh Capron Concrete Mixers
 Kwik-Mix Tilting Mixers
 Johnson Bins and Hoppers
 Superior Saw Rigs
 Cleveland Red Star Wheelbarrows, Carts, Chutes and Batch Boxes.
 Novo Engines, Hoists, Pumps and Air Compressors
 Aeroll Concrete Heaters

"Brooks for Concrete Equipment"**R. E. BROOKS CO.***Equipment for Contractors***50 Church St. New York City****Representing**

KOEHRING COMPANY
 INSLEY MFG. CO.
 C. H. & E. MFG. CO.
 BLAW-KNOX CO.
 NATIONAL HOISTING ENGINE CO.
 BAY CITY FOUNDRY & MACHINE CO.
 HANDY SACK BALER CO.
 ORD CONCRETE ROAD FINISHERS

THE HUBBARD-FLOYD CO., Inc.

452 Lexington Avenue, New York

Representing

NORTHWEST ENGINEERING CO.
 Crawler Cranes, Draglines and Shovels.
 KNICKERBOCKER COMPANY
 Concrete and Mortar Mixers, Saw Mgs.
 BARNES MANUFACTURING CO.
 Diaphragm, Pressure and Centrifugal Pumps.
 THE BUHL COMPANY
 Portable Air Compressors.
 T. L. SMITH CO.
 Paving Mixers.
 LIDSEWOOD MFG. CO.
 Gasoline Hoisting Engines.
 LAKEWOOD ENGINEERING CO.
 Road Building Equipment
 GILMAN MANUFACTURING CO.
 Rock Drills
 J-T TRACTOR CO. ROGERS BROS.
 Five-Ton Tractors Heavy Duty Trailers

BROWN & SITES COMPANY*Specialists in Contractors' Equipment***Main Office: 30 Church Street****NEW YORK CITY***Exclusive Representative*

Lakewood Engineering Co.
 Mundy Hoisting Engine Co.
 Davenport Locomotive Company
 Lawrence Machine Company
 Hoar Shovel Company

E. B. KELLEY CO. Inc.*Concrete Machinery*

New York Office
 130 W. 42nd St.

Newark Office
 235 Halsey St.

Buffalo Office
 1125 Niagara St.

Phila. Office
 520 Arch St.

Representing:

Jaeger Concrete Mixers.
 Sasgen Derricks and Winches.
 Heltzel Steel Sidewalk and Curb Forms.
 Cement Block and Brick Machinery.

GINSBERG-PENN CO.

Incorporated

18 East 41st Street, New York City*Construction Equipment*

Chain Belt Co.,	Archer Ir. Wks., Cone.
Rex Mixers, Pavers	Chuting Equipment.
O. E. Clutch & Mch'y.	Acme Rollers
Co., Gas and Electric	Ideal Cement Grader
Hoists	Blocks
Byers Machine Com-	Domestic High Press-
pany, Cranes	ure Pumps
Beach Mfg. Co., Saw	Link Belt Cranes and
Rigs	Shovels.
Butler Equip. Co., Steel	Hotchkiss Steel Road
Bins and Batchers.	and Curb Forms
Warehouse Stock	Service Station

Telephone, Vanderbilt 2739-2739

William H. Norden Company**268 West 34th Street, N. Y. C.***Representing:*

LA PLANT-CHOATE MFG. CO.
 Trailers and Snow Plows
 LITTLE RED WAGON MFG. CO.
 "Stroud" Elevating Graders and
 Dump Wagons
 CHICAGO GYMNASIUM EQUIP. CO.
 Playground Equipment

G. S. GREEN CO., INC.*Contractors' Equipment & Supplies***HEAVY HARDWARE****New York Office****New Jersey Office****and Warehouse:****and Warehouse:****72-74 Warren St.****Shupe Terminal****Kearny, N. J.****AGENTS AND DISTRIBUTORS FOR**

Dobbie Fdry. & Mach.	R. B. Carter Company:
Co.: Derricks,	"Humdinger" Pumps.
Winches, Fittings.	Cleveland Wheelbarrow
Gray Iron Fdry. Co.:	Co.: "Red Star"
Concrete Mixers,	Wheelbarrows.
Carts, etc.	Wright Mfg. Co.: Chain
	Hoists and Trolleys.

Complete Lines Carried in Stock

Telephone Hanover 0211

S. B. Winery Corporation**95 Liberty Street****New York****The Bourse****Philadelphia, Pa.***Representing:*

Aurora Pump & Mfg. Co.—Pumps—Centrifugal,
 Deep Well, Steam and Power.
 Western Electric Company—Motors, Generators,
 Etc.
 Columbus Steam Pump Works—Pumps, Simplex
 and Duplex, Steam and Power.

Haverstick & Company, Inc.

Ford and Spring Sts., Rochester, N. Y.

CATERPILLAR TRACTOR CO.
 REPUBLIC IRON WORKS. Concrete Mixers
 LANSING COMPANY. Barrows, Scrapers, etc.
 INGERSOLL-RAND COMPANY Air Compressors
 GARDNER GOVERNOR CO. Steam Pumps, Air
 Compressors
 AMERICAN STEEL & WIRE CO. Wire Rope
 DOMESTIC ENGINE & PUMP CO. Pumping
 Units, Hoists, etc.
 D. BOUND & SONS CO. Chain Hoists, Winches,
 etc.
 GOODYEAR TIRE & RUBBER CO. Hose, Belt-
 ing, etc.
 GOULDS PUMPS, INC.
 CONNEAUT SHOVEL CO.
 BAKER MFG. CO. Baker Maney Scrapers, Bull-
 dozers, Snow Plows
 UNION IRON WORKS Sargent Snow Plows

J. B. NORTON COMPANY

INCORPORATED

UTICA

NEW YORK

REPRESENTING

Advance-Humely Thresher Co., Inc.
 Chicago Automatic Tampo Co.
 Gallion Iron Works & Mfg. Co.
 Kramer Automatic Tampo Co.
 Rotary Snow Plow Co.
 Schramm, Inc.
 Universal Road Machinery Co.

BREWSTER & WILLIAMS, Inc.

613 DILLAYE BLDG.,

SYRACUSE, N. Y.

Contractors' Supplies and Equipment

"REX" Mixers and Pavers
 Blaw-Knox Road Equipment
 Carey ELASTITE Expansion Joint
 American Steel & Wire Co.'s Mesh Reinforcement
 Littleford Asphalt Heaters and Tools
 Saw Rigs, Pumps and Hoists
 Haiss Loaders and Conveyors
 "Easton" Rollover Bodies and Batch Boxes
 Byers Machine Co., Skimmers and Cranes
 M. & M. Form Clamps and Column Clamps

Member: Associated Equipment Distributors

E. F. CRAVEN

"The Road Machinery Man"

GREENSBORO NORTH CAROLINA

REPRESENTING

Caterpillar Tractor Co.	Littleford Brothers
Russell Grader Mfg. Co.	Ward Flow Co.
Erie Steam Shovel Co.	Universal Crane Co.
Buffalo Springfield	Carbic Mfg. Co.
Roller Co.	D-A Lubricant Co.
Ingersoll-Rand Co.	Baker Mfg. Co.
Western Wheeled	Erie Steel Constr. Co.
Scrapper Co.	Wyoming Shovel Wks.
Domestic Engine and	Chain Belt Co.
Pump Co.	The Parsons Co.
Watson Truck Corp.	G. H. Williams Co.
	Geo. Haiss Mfg. Co.

Miller Equipment Co., Inc.

Syracuse - New York

Representing:

Domestic Engine & Pump Co.
 Mead-Morrison Mfg. Co.
 Bay City Dredge Wks.
 Burch Plow Wks.
 Lee Trailer & Body Co.
 J. T. Tractors
 Archer Iron Works
 Sauerman Drag Scrapers
 Leach Co.

J. D. WILKINSOffice and Warehouse—West Lee Street
Greensboro, N. C.

REPRESENTING

Clyde Iron Works—Steam, Gas, Electric Hoists;
 Steel Derricks, Derrick Irons,
 Leach Co.—Celebrated Leach-Oakshoe Building
 Mixers, Material Elevators, Saw Rigs.
 Ralph B. Carter Co.—Humdinger Pump and Sup-
 plies.
 Williamsport Wire Rope Company—Williamsport
 "Telfax Tape Marker."
 Saagen Derricks.
 Archer Iron Works—Steel Tower Units, Concrete
 Towers and Equipment.

J. SHUMAN HOWER

MATERIAL HANDLING EQUIPMENT

106 Foster Bldg. Utica, N. Y.

Representing

UNIVERSAL CRANE CO.—Cranes
 LINK-BELT CO.—Shovels and Conveyors
 G. H. WILLIAMS CO.—Buckets
 C. S. JOHNSON CO.—Bins and Hoppers
 RALPH B. CARTER CO.—Pumps
 LAKEWOOD ENGINEERING CO.
 GOULD PUMP CO.
 HILL DIESEL ENGINE CO.

J. C. NEELY & CO.201 Goldberg Building
CANTON, OHIO

Representing

ATLAS Portable Conveyors
 REPUBLIC Concrete Mixers
 GOOD ROADS MACHY. CO. Road Building
 Equipment
 CONNERY Tar and Asphalt Kettles
 DOMESTIC Pumps and Air Compressors
 Railway Equipment — Tar and Asphalt Products
 Reinforcing Steel — Railway Culvert Pipe

The Geo. B. Curd Equipment Co.609-611 Reading Road
CINCINNATI, OHIO*Distributors:*

Caterpillar Tractor Co.	Beet & Holt Tractors
Climax Engineering Co.	Contractors & Industrial Equip.
Lakewood Engineering Co.	Baker Maney Wheel Scrapers
Smith & Sons Mfg. Co.	Pumping Machinery
Baker Mfg. Co.	Crawler, Cranes & Shovels
Barnes Mfg. Co.	Conveyors
Northwest Engineering Co.	Road Rollers, Crushers, etc.
Atlas Engineering Co.	Wagon Loaders
Aemo Road Mach'y Co.	Tractor Dump Trailers
Geo. Hahn Mfg. Co.	Gasoline Hoists
LaPlant-Cheate Mfg. Co.	
O. K. Clute & Masby Co.	

Member: Associated Equipment Distributors

**THE W. M. PATTISON
SUPPLY CO.**

777 Rockwell Ave., Cleveland, Ohio

REPRESENTING:

American Saw Mill Mach. Co.—Wood Working Machinery.
Domestic Pump & Eng. Co.—Contractors' Pumps.
Emerson Pump Co.—Emerson Steam Pumps.
Ingersoll-Rand Company—Air Compressors and Tools.
Jaeger Machine Co.—Concrete Mixers.
Orr & Sembower, Inc.—Hoisting Engines, Boilers.
Saugen Derrick Co.—Derricks, Winches.
Wall Rope Company—Manila Rope.
Watson Truck Corp.—Contractors' Dump Wagons.
Western Wheeled Scraper Co.—Scrapers.
Member Associated Equipment Distributors.

The Queen City Supply Co.

Pearl and Elm Sts. Cincinnati, Ohio

REPRESENTING:

T. L. Smith Co.—Building and Paving Mixers.
Clyde Iron Works Co.—Hoisting Engines.
Ingersoll-Rand Co.
National Electric Mfg. Co.
Heltzel Steel Form & Iron Co.—Road Forms.
Hercules Motors Corp.—Gas and Gasoline Engines.
Wyoming Shovel Co.—Red Edge Picks and Shovels.
Watson Truck Corp.—Pump Wagons, Tractors and Trailers.
Domestic Engine & Pump Co.
Cincinnati's Largest Equipment House.

MEMBER

ASSOCIATED EQUIPMENT DISTRIBUTORS

Peden Equipment Co.

10230 Berea Rd.

Cleveland, Ohio

The Lakewood Engineering Company, Concrete Mixers, Chuting Plants, etc.
Northwest Engineering Company, Gas Shovels, Cranes and Draglines.
Butler Bin Company, Steel Bins and Measuring Hoppers.
Leach Company, Tilting Drum Mixers.
Topping Machinery Company, "Pony Ditchers".
Heltzel Steel & Iron Company, Road and Sidewalk Forms.
Sterling Wheelbarrow Company.
Gas Electric Hoist, Conveyors, Dump Wagons, etc.

Bacon Engineering Sales Co.,

MARVIN J. BACON, Manager

251 Erie Bldg. Cleveland, Ohio

HUG DUMP TRUCKS
REX PAVING MIXERS
REX BUILDING MIXERS
McMYLER CRANES
ERIE AGGREGATE PLANTS
MIDWEST LOCOMOTIVES
BARNES PUMPS
HOTCHKISS STEEL FORMS
ARCHER STEEL MAST HOISTS
Cleveland Warehouse Rental Service
Phone—Superior 939.

E. F. PEGG EQUIPMENT CO.

130 Engineers Bldg. Cleveland, O.

Main 2138

Representing:

Ransome Concrete Mixers & Chuting Plants.
National Hoists—Electric, Steam & Gasoline.
National Pile Hammers.
Universal Screening Plants and Unloaders.
Berg Concrete Surfacers, Finishers and Electric Air Cushioned Hammer.

The Day & Maddock Company*Contractors' New and Rebuilt Equipment*

West 82nd St., So. of Denison Ave., Cleveland, O.

Representing

Broderick & Bascom Rope Co.	—Wire Rope
Heltzel Steel Form & Iron Co.	—Sidewalk Forms
Huber Manufacturing Co.	—Rollers
Humphreys Mfg. Co.	—Diaphragm Pumps
Knickerbocker Company	—Mixers
Marion Steam Shovel Co.	—Shovels & Cranes
E. J. McHarg & Co.	—Multi-Foot Pavers
Owen Bucket Co.	—Clamshell Buckets
Rommel Manufacturing Co.	—Tilting Mixers
Sterling Wheelbarrow Co.	—Wheelbarrows
Sullivan Machinery Co.	—Air Compressors
Thomas Elevator Co.	—Hoists
Union Iron Works	—Pile Hammers
Orton Crane & Shovel Co.	—Cranes

Member: Associated Equipment Distributors

POPE EQUIPMENT CO.

Kent Pope, Mgr.

4111 Euclid Ave., Cleveland, Ohio

Transportation Engineers

Highway Trailers—All Sizes and Kinds
Lessmann Loaders
Municipal Equipment
Traffic Signals
Solar Sturges City Street Waste Boxes
Andresen Road Repair Outfits
Littleford Bros. Tar Kettles

JOHN McNEILLY

335 South High St. Columbus, Ohio.
REPRESENTING

The Parsons Co.
Trenching Machines, etc.
Northwest Engr. Co.
Electric & Gasoline Cranes,
Shovels and Draglines
Mead-Morrison Co.
Hoisting Mach., Tractors,
Buckets, Gasoline Cranes
Ransome Conc. Mach. Co.
Concrete Mixers, Steel
Towers and Chutes
Blystone Mfg. Co.
Concrete, Mortar and Plaster
Mixers
American
Gasoline Saws

Erie Steel Constr. Co.
Aggregators, Steel Bins
McKiernan-Terry Drill Co.
Pile Hammers, Jacks
Sagen Derrick Co.
Derricks, Winches, etc.
Hercules Motors Corp.
Gasoline Engines
Le Roi Co.
Gasoline Engines
Pulsometer Steam Pump
Co., Pumps
De Walt
Electric Saws

W. A. KUHLMAN & CO.

CONTRACTORS' EQUIPMENT

340-342-344 Water Street, TOLEDO, OHIO

Smith Pavers and Building Mixers
Smith Crushers and Quarry Equipment
Northern Conveyors and Steel Storage Bins
Bauerman Drag Line Outfits
Barnes Pumping Outfits
Clyde Hoists and Derricks
Metaform Steel Road and Sidewalk Forms
Sagen Wooden Derricks and Winches
Ord Finishing Machines
Insley Excavators, Steel Towers and Mast Hoist
Outfits, Air Compressors, Saw Tables, Wire
Rope, Etc.
Union Iron Works, Steam Hammers, Etc.

Member: Associated Equipment Distributors

SEIBERT-MILBURN CO.

141 N. FRONT ST. COLUMBUS, OHIO.

Smith Paver and Building Mixers
TelSmith Crushers and Washing Plants
Insley Concrete Handling Machinery, Excavators,
Guy and Stiffing Derricks
Pioneer Blackline Cableway Buckets
Thomas Electric Hoists
Owen Clamshell Buckets
Ingersoll Rand Compressors and Tools
Haise Loaders and Conveyors
Sunbury Car Unloaders
Monolithic Steel Forms
Orr and Sembower Hoists and Boilers
Erie Gasoline and Steam Shovels
Domestic Pumping Outfits
Sagen Derricks
Little Wonder Scaffolding Hangers
Atlas Shores
Joyce Jacks
MEMBERS: Associated Equipment Distributors

The National Supply Company

TOLEDO, OHIO

Contractors' Equipment and Supplies

DISTRIBUTORS FOR

Ingersoll-Rand Company
Essick Plaster Mixer Company
Ransome Concrete Machine Company
Novo Engine Company
Roebbling's Wire Rope
Red Edge Shovels
Bego Welding and Cutting Equipment
and other high class goods.

Everything for the Contractor
The best of its kind

The W. W. Williams Co.

COLUMBUS, CLEVELAND, TOLEDO, CINCINNATI

REPRESENTING

The Koehring Company
The Sterling Motor Truck Co.
The G. H. & E. Mfg. Co.
Hog Company
The Monarch Tractor Co.
The Sterling Wheelbarrow Company
A. W. French & Co.
Blaw-Knox Co.
Construction Machinery Co.
and other well-known manufacturers of
contractors' equipment.

J. R. VANKEPPEL

211 William St.

Toledo, Ohio

Representing:

NORTHWEST ENGINEERING COMPANY
LAKEWOOD ENGINEERING COMPANY
FAIRFIELD ENGINEERING COMPANY
THE PARSONS COMPANY
NELSON IRON WORKS
MULTI FOOTE PAVERS
ACME ROAD GRINDERS

T. J. LANE EQUIPMENT COMPANY

Everything for the Contractor

SPRINGFIELD, OHIO

Representing

The Chain Belt Company. Rex Pavers, Building Mixers
Heltzel Steel Form Company. Steel Road Forms
Barnes Manufacturing Company. Road and Diaphragm Pumps
Freeman Manufacturing Co. Turntables for Road Builders
G. S. Johnson Company. Steel Bins
Bay City Dredge Co. Cranes, Grading and Sewer Excavators
Street Brothers. Steam, Electric and Gasoline Hoists
Sagen Derrick Company. All Kinds of Derricks
Jes. Hensheret Company. Tar Heaters and Sand Dryers

J. WALKER WILSON

CONTRACTORS' MACHINERY

1009 Mahoning Bank Bldg.

YOUNGSTOWN

OHIO

EXCLUSIVE SALES AGENT

For Keystone Driller Company in Northern Ohio
and Northwestern Pennsylvania.
Keystone Traction Excavator for Road
Grading, Trenching, Back-Filling, and Cellar
Digging
The Locomotive Crane Co.
Acme Road Machinery Co.
Blaw-Knox Co.
The Foote Co., Inc.

Telephone 3-5766

CLYDE EQUIPMENT CO.*Contractors' Equipment and Supplies*

Portland, Oregon

Seattle, Wash.

Aene Road Machinery Co.
Barber Asphalt Paving Co.
Barson Mfg. Co.
Barber-Groene Co.
The Buda Co.
Byers Machine Co.
Champion Blower & Forge Co.
Clyde Iron Works
Gardner Governor Co.
Handy Back Baler Co.
R. Hos & Co.
Lakeview Engineering Co.
LeRoi Engine Co.
Lee Trailer & Body Co.
Lincoln Electric Company

Boecyrus Co.
Alexander Millburn Co.
Ohio Locomotive Crane Co.
Rumsey Pump Co.
Saugen Hoist & Derrick Co.
Sauerman Brothers
Shaw Enoch Tractor Co.
Sidney Steel Scraper Co.
Sterling Wheelbarrow Co.
Vulcan Iron Works
Sullivan Machinery Co.
Traylor Eng. & Mfg. Co.
Union Iron Works
Western Wheel Scraper Co.
Wheland Co.

Member: Associated Equipment Distributors

Loggers and Contractors Machinery Company

Portland, Ore.

Office, 70 4th St. Shop, 17th & Sherlock

Representing

Erie Steam Shovel Co.
Chain Belt Co.
Inaley Manufacturing Co.
G. H. Williams Co.
Pioneer Bucket Co.
H. K. Porter Co.
Geo. D. Whitcomb Co.
C. D. Edwards Mfg. Inc.
Sidney Steel Scraper Co.
Wyoming Shovel Works
LeRoi Co.

FEENAUGHTY MACHINERY CO.*Road & Contractors' Equipment*

309-315 E. Yamhill St., Portland, Ore.

Representing

Austin Manufacturing Co.
Austin Western Road Machinery Co.
Baker Manufacturing Co.
Caterpillar Tractor Co.
F. D. Cummer & Son Co.
The Foote Company, Inc.
Penna. Boiler Wks.
Four Wheel Drive Auto Co.
Ingersoll-Rand Co.
Jager Machine Co.
Jeffrey Manufacturing Co.
Birdsell Mfg. Co.
Hart Grain Weigher Co.

La Plant-Chaste Mfg. Co.
Hill Diesel Eng. Co.
Newport Rolling Mill Co.
The Russell Company.
Sterling Wheelbarrow Co.
St. Marys Oil Engine Co.
Thew Shovel Co.
Troy Wagon Works Co.
Universal Crane Co.
Western Wheel Scraper Co.
Webb City & Cartersville Foundry & Machine Works
Amer. Saw Mill Machy. Co.
The Owen Bucket Co.

McCracken-Ripley Co.

61-67 Albina Ave.

Portland, Ore.

REPRESENTING

Atlas Lumnite Cement Co.—Lumnite Cement
Atlas Portland Cement Co.—White Cement
Union Metal Mfg. Co.—Union Metal Columns
M. & M. Form Clamp Co.—Form Clamps
Blystone Mfg. Co.—Plaster Mixers
Cleveland Wheelbarrow & Mfg. Co.—Red Star Wheelbarrows, Concrete Carts
Construction Machinery Co.—Wonder Mixers and Hoists
Pacific Coast Steel Co.—Reinforcing Steel

Full Supply of Building Specialties

Howard-Cooper CorporationPortland - Seattle - Spokane - Boise
San Francisco**Representing**

Austin Machinery Corporation—Sewer Trenches
Good Roads Machinery Co.—Road Machinery
Schramm, Inc.—Air Compressors
Symons Brothers Co.—Disc Rock Crushers
Orton Crane & Shovel Co.—Gas Shovels and Cranes
Stutz Fire Engine Co.—Fire Apparatus
Eagle Wagon Works—Dump Wagons
Gramm-Kincaid Motor Truck Co.—Motor Trucks
Yuba Mfg. Co.—Tractors
Gilbert—Power Graders
Stockland Machine Co.

HERR "THE PUMP MAN"

Lancaster

Penna.

REPRESENTING:

The Gould Mfg. Co., Pumps
Construction Machinery Co., Mixers and Hoists
Century Electric Co., Motors
Buch Mfg. Co., Barrows
Louden Machinery Co., Barn Equipment
Domestic Engine & Pump Co., Hoists and Compressors & Pumps
Fuller & Johnson Co., Gas Engines
Wood Working Machinery

J. L. LATTURE EQUIPMENT CO.

354 Belmont St., Portland, Oregon

REPRESENTING

Keystone Driller Co., Excavators
Smith Eng. Wks., Rock Crushers, Gravel Plants
Knickerbocker Concrete Mixers
Gallon Ir. Wks. & Mfg. Co., Road Rollers, Graders
Atlas Imperial Engine Co., Diesel Engines
Columbia Concrete Carts
Ideal Concrete Machy. Co., Conc. Block Machines
American Steel Scraper Co., Scrapers and Flows
Wood Shovel & Tool Co., Molybdenum Shovels
Blaw-Knox Co., Road Forms, Clam Shell Buckets
Watson Truck Corp., Dump Wagons

**CONTRACTORSEQUIPMENT
CONBOY CO.
CONSTRUCTION MACHINERY**

Perry Bldg.,

Philadelphia

REPRESENTING

Baker-Maney Scrapers
Charter Fuel Oil & Kerosene Engines
Minster Gasoline Engines
Orr & Semhower—Concrete Mixers, Hoists, Boilers
Clamsell Buckets
Burck Stone Spreaders, Unloaders and Conveyors

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

DE HUFF AND HOPKINS*Engineering Equipment***Morris Bldg. Philadelphia, Pa.****REPRESENTING:**

Bay City Dredge Works
Power Operated Shovels
Brookville Truck & Tractor Company
Ford & Fordson Locomotives
Coffin Valve Company
Sinice Gates and Shear Gates
Easton Car and Construction Company
Car and track equipment for contractors,
Dump Bodies, Measuring Hoppers, Etc.
Milwaukee Locomotive Mfg. Co.
4-Speed Geared Type Gasoline Locomotives
Fordson Type Bucket Loaders

SERVICE EQUIPMENT COMPANY*Sales Engineers***211 North Third Street, Philadelphia, Pa.****REPRESENTING:**

Knickerbocker Mixers, Saw Rigs O. K. Hoists, Air Compressors LeRoi Engines Toledo Wheelbarrows U. S. Standard Block Machine Stewart Tilting Drum Mixers	Skelton Shovels Hauck Heaters Archer Tower Equip- ment Sagen Derricks Milburn Lights Amer. Floor Surfacing Machines Ind. Fdry., Builders' Heavy Hardware
--	---

Member: Associated Equipment Distributors

Dravo Equipment Company**1505 Race St. Philadelphia, Pa.**

MARSH-CAPRON Concrete Mixers.
KWIK-MIX Tilting Mixers.
Sidewalk, Curb and Gutter Forms.
HAISS Loaders and Conveyors.
SUNBURY Car Unloaders.
BARNES Pumps.
PIONEER Slackline Excavators
MILBURN Lights, etc.
Air Compressors.
MEAD-MORRISON Hoists, Tractors and Cranes.
CLEVELAND Wheelbarrows and Carts.
JONES Superior Saw Tables.
JOHNSON Demountable Bins and Hoppers.

Member: Associated Equipment Distributors

**SERVICE SUPPLY CORPORATION****20th and Venango Sts.
Philadelphia, Pa.****REPRESENTING:**

American Cement Machine Co.—Box Concrete Mixers
Owen Bucket Co.—Clam Shell Buckets
S. Flory Mfg. Co.—Gasoline, Steam & Elec. Hoists & Cablesways.
Archer Iron Works—Concrete Towers and Spouting
LeRoi Engine Co.—Gasoline Engines.
The MacClead Co.—Melting Furnaces & Concrete Heaters
Conneaut Shovel Co.—Conneaut Special Shovels
Mandt Co.—Fordson Loaders, Cranes & Buckets
The Hoar Shovel Co.—Digging Shovels.
Buckeye Jack Mfg. Co.—Jacks, all kinds.
Sidney Steel Scraper Co.—Drag & Wheel Scrapers, Concrete
Carts & Wheelbarrows.

EDELEN & BOYER CO.*Construction and Industrial Equipment***Office & Warehouse 236 No. 23rd St., Philadelphia, Pa.****Representing:**

Foots Paving Mixtures Freeman Turntables Freemo Drags and Scrapers Hetzl Steel Road, Sidewalk, Curb and Gutter Forms Sagen Derricks Union Steam Pipe Hammers Wunder Mixers Miles Block Machines Pulometer Steam Pumps Graders and Scarifiers Nelson Loaders	Building Mixers, Concrete Tow- ers and Chuting Plants, Clam Shell Buckets, Finishing Ma- chines, Industrial Cars Hoisting Engines, Boilers Stiff Leg and Guy Derricks Saw Rigs, Road Builders Equipment Canvases and Burlap Barrows, Shovels, Picks Concrete Tools, etc.
--	--

Member: Associated Equipment Distributors.

J. Jacob Shannon & Co.**1744 Market Street 1744****PHILADELPHIA****REPRESENTING:**

"Mundy" Steam, Elec- tric & Gasoline Hts. "Nova" Gasoline Eng. and Outfits "Lakewood" C. & C. Mixers, Chutg Equip- ment, Road Equip. "Williams" Clam Shell Buckets "Terry" Steel Erec- tors' Derricks "Sterling" Wheelbar- rows and Carts	"Yale" Hardware & Chain Hoists "Roebbling" Wire Rope "Wyoming" Red Edge Shovels "Sagen" Derricks & Winches "Berg" Conc. Sur- facers & Finishers "Bates" Wire Ties & Tying Tools "Emerson" Pumps "Shannon" Derricks & Derrick Fittings
---	--

GILES & RANSOME**231-33 No. 12th St., Philadelphia, Pa.****202 Long Bldg., Baltimore, Md.****Ransome Concrete Machinery Co.—**
Concrete Mixers and Appliances.**Blaw-Knox Company—Clam-shell Buck-
ets, Steel Forms, Steel Buildings, Steel Bins,
Richmond Screw Anchor Company—**
Concrete Specialties.**The Barnes Mfg. Company—Centrifugal
Diaphragm and Force Pumps.****Northwest Engineering Co. — Gasoline
Cranes and shovels.****Ord—Road Finishing Machine****STALEY & MORRIS, Inc.****214-220 N. 22nd St. Philadelphia, Pa.****DISTRIBUTORS**

REX Concrete Mixers, Pavers BUTLER Bins, Batch Hoppers LITTLEFORD Kettles, Asphalt Tools DOMESTIC Pumps, Hoists, Compressors CUMMER Asphalt Plants, Dryers J. T. Tractors BEACH Saw Rigs	ARCHER Concrete Chuting M & M Form Clamps LeROI Engines TOLEDO Wheelbarrows UNIVERSAL Block Makers MULTIPLEX Block Machines PEERLESS Brick Machines NEW HOLLAND Crushers BARNETT Lift Trucks SPEEDER Cranes, Shovels
---	---

Everything For the Contractor and Cement Products Manuf.

MEMBERS: Associated Equipment Distributors

LEE T. WARD CO.

617 Filbert St.

Philadelphia

REPRESENTING

Akron-Barrow Co.
Byers Machine Co.
C. H. & E. Mfg. Co.
Erie Steel Construction Co.
Hotchkiss Steel Form Co.
Ideal Concrete Machinery Co.
Jaeger Machine Co.
Koehring Co.
National Hoisting Engine Co.
Universal Form Clamp Co.

Pittsburgh Machinery & Equipment Company

Fulton Bldg.

Pittsburgh, Pa.

Contractors' Machinery*In Stock at Aspinwall, Pa.*

ERIE STEAM SHOVELS
Locomotive Cranes
Dinkey Locomotives
Road Rollers
Hoisting Engines
Concrete Mixers
Pumps, Derricks, Buckets
Rock Crushers

BECKWITH MACH'Y CO.

Cleveland PITTSBURGH Philadelphia

Aldrich Road Pumps	Lee Dump Bodies
Anchor Concrete Mach'y	Leschen Wire Rope
Baker Maney Scrapers	McKiernan-Terry Hammers
Beach Portable Saws	Nagle Boilers
Blaw-Knox Equipment	Northern Conveyors
Blystone Mixers	Northwest Shovels
Caterpillar Tractors	Ord Road Finishers
Clyde Hoists & Engines	Pulsometer Pumps
Dobbie Derrick Fittings	Sagen Derricks
Farguhar Boilers & Engines	Sauerman Cable Ways
Halse Path Digging Loaders	Smith Mixers and Pavers
Humphreys Pumps	Smith Crushers
Inley Excavators	Sterling Wheelbarrows
Inley Towers & Chutes	Stockland Graders
LaPlant-Chaste Wagons	Sunbury Unloaders
LeRoi, Climax, Hercules and	Universal Form Clamps
Waukegan Engines	Wyoming Shovels

Member: Associated Equipment Distributors

IN PITTSBURGH!**RUANE MACHINERY CO.***Warehouse, Office and Yard:*

Corner W. Robinson and Dasher Streets

Represents:

RANSOME CONCRETE MACHINERY CO.—
Mixers, Pavers, Chuting Plants.
OSGOOD COMPANY—
Steam Shovels.
IDEAL CONCRETE MACHINERY COMPANY—
Concrete Block Plants.
BOOS-MEYER-HECHT COMPANY—
Atlas Adjustable Shores.
O. E. CLUTCH & MACHINERY CO.—
Hoists and Compressors.
CHICAGO AUTOMATIC CONV. CO.—
Portable Conveyors.

Dravo Equipment Company

300 Penn Avenue

Pittsburgh, Pa.

NOVO—Pumps, Hoists, Compressors.
Combination Hoist and Compressor
Engine—1½ to 40 H.P.
MARSH-CAPEON Rail Track Mixers
Kwik-MIX Tilting Concrete Mixers
JOHNSON Demountable Bins and Hoppers
Steel Road Forms
Side-walk and Curb Forms
HAENISCHPEGER CORP. Cranes and Shovels
SAW RIGS and Miscellaneous Equipment

Member: Associated Equipment Distributors

HEGGLER

GEO. W. ZIEGLER MACH'Y CO.

CONTRACTORS' EQUIPMENTOffice and Warehouse
Pittsburgh, Pa.Yards and Shops
Rock, Pa.**REPRESENTING**

Austin Mfg. Co.	Jaeger Machine Co.
Austin-Western Road Machin- ery Co.	Koehring Co.
Butler Bin Co.	Cleveland Tractor Co.
C. H. & E. Mfg. Co.	M. & M. Form Clamp Co.
Papke Block Machine	Metal Forms Corp.
Hardwoy Wonder Drill Co.	Monarch Tractors
Ingersoll-Rand Co.	National Hoisting Engine Co.
	Rotary Snow Plow Co.
	Watson Truck Corp.

MARTIN J. O'BRIEN CO., Inc.

803 Union Bank Bldg.

Pittsburgh, Penna.

Trackshifters—Underground Shovels
Bay City Semi-Circular Cranes
Bay City Skimmers
Heisler Geared Locomotives
Austin Backfillers and Trenchers
Fairmont Mining Machinery
Railroad Spike Drivers

Standard Machinery & Equipment Co.

Spartanburg, South Carolina

CONTRACTORS' SUPPLIES and EQUIPMENT

Cummers Asphalt Plants	Hug Co. Sub-graders, Turn- tables, Truck & Dump Bodies
Southern Boilers and Engines	Tanks for Asphalt and Oils
Andrew Street Repair Outfit	Western Wheelbarrows
Littelford Bros. Asphalt Tools	Burch Stone Spreaders
Hammell Oil Burners and Pumps	Emerson Pumps
Brown Pyrometers	Cement, Sand and Stone
Multi-Foot Pavers and Trailers	Stop and Go Signals for Cities
Buffalo-Springfield Rollers	Whitcomb Locomotives
Jaeger Concrete Mixers	Berling Wheelbarrows, Wyom- ing Shovels
Concrete Chuting and Elevators	Concrete and Metal Pipe
Handy Back Cleaners and Balers	Basin Crawler Tractors
Erie Steam Shovels and Cranes	Domestic Pump and Hoists
Relined Road Forms	New Gasoline Hoists
Barber-Greene Loaders	Butler Bins and Hoppers
Superior Auto. Dump Bodies	Armstrong Well Drills
Eagle Dump Wagons	
Brookburg Hoists	

Members: Associated Equipment Distributors

WESTERN MATERIAL COMPANY

Sioux Falls

South Dakota

DISTRIBUTORS:

Caterpillar Tractor Co.
Construction Mch. Co.
Western Wheeled
Scraper Co.
Barber-Greene Co.
Novo Engine Co.
Blaw-Knox Co.
Iowa Mfg. Co.
M & M Form Clamp Co.
Stockland Rd. Mch. Co.
Littleford Bros.

La Plant-Choate Co.
Sargent Snow Plows
Carney Roofing and
Elastite
Manhattan Belting
Yellowstrand Wire
Rope
Sterling Wheelbarrows
Red Edge Shovels
D-A Lubricant
Shawnee Maintainers
All Metal Snow Fence

Member: Associated Equipment Distributors

HARVILL SUPPLY COMPANY

415 Commerce Street

NASHVILLE

TENNESSEE

Jaeger Machine Co., Concrete Mixers.
Chicago Pneumatic Tool Co., Air Com-
pressors, Rock Drills.
Byers Machine Co., Cranes, Shovels.
Iowa Manufacturing Co., Rock Crushers.
Novo Engine Co., Gasoline Engines,
Pumps and Hoists.
Charles Hvass & Co., Street Sweepers,
Sprinklers, Etc.

Learn by the
**EXPERIENCE
OF OTHERS**

Run your eye over
pages 3 to 39

Wilson-Weesner-Wilkinson Co.

Nashville, Tenn.

*Contractors' Equipment and Concrete
Reinforcement in Stock*

REPRESENTING:

Keckring Co.
Construction Mach. Co.
Blaw-Knox Co.
Barber-Greene Co.
Western-Wheeled Scraper Co.
Littleford Bros.
Archer Iron Works
Ingersoll-Rand Co.
Clyde Iron Works

NIXON-HASSELLE CO.

Chattanooga, Tennessee

CONTRACTORS' EQUIPMENT

Blaw-Knox Buckets and Forms
C. H. & E. Saw Rigs, Pumps and Hoists
Cameron Pumps
Haise Loaders and Conveyors
Ingersoll-Rand Compressors
Rex Mixers and Pavers
Northwest Cranes and Shovels
Fenestra Steel Bash
Vulcan Steam and Gasoline Locomotives
Parsons Trench Machines and Backfillers
Also Wheelbarrows—Carts—Benders—Cutters—
Shovels—etc.

"He Profits Most, Who Serves Best."

J. W. BARTHOLOW COMPANY

Machinery Contractors' Equipment and Supplies
1221 SOUTH LAMAR ST. DALLAS, TEXAS

RANSOME Mixers, Crushers	NORTHWEST Cranes
LE ROI Engines	OWEN Buckets
SARGENT Derricks	UNIVERSAL Trunk Cranes
NATIONAL Hoists	RANSOME Pavers
AMERICAN Saw Rigs	PLYMOUTH Locomotives
BLYSTONE Plaster Mixer	LAKEWOOD Finishers
DOMESTIC Pumps	LAKEWOOD Road Forms
WYOMING Shovels, Picks	BARBER-GREENE Loaders
AKRON Wheelbarrows	HONHORST Tar Kettles
WIARD Pumps	BUTLER Bins
CYCLONE Drills	TELSMITH Crushers, Screens
GILLIVAN Air Compressor	PARSONS Dischargers
ATLAS Shovels	McKERNAN-TERRY File Hammers, Jacks, Etc.

MEMBER: Associated Equipment Distributors

R. L. HARRIS

Knoxville
Tenn.

Barclay Plow *Representing*
Buffalo-Springfield Roller Co.
A. B. Farquhar, Ltd.
Huber Mfg. Co.
Good Roads Machinery Co.
Foots Concrete Machine Co.
Construction Machinery Co.
Western Wheeled Scraper Co.
Wood Drill Works
Blaw-Knox Co.
Caterpillar Tractor Co.
Erie Steam Shovel Co.
Domestic Engine & Pump Co.
Ingersoll-Rand Co.
Lakewood Engr. Co.
La Plant-Choate Mfg. Co.
Russell Grader Mfg. Co.
Watson Truck Corp.
Wyoming Shovel Works

Member: Associated Equipment Distributors

SHEEHAN & COMPANY

Steel Products and Contractors' Equipment

1615 Bassett Avenue El Paso, Texas

REPRESENTING

T. L. Smith Co.	Inslay Mfg. Co.
Smith Eng. Works	The Parsons Co.
Barber-Greene Co.	Acme Road Mch. Co.
Northwest Eng. Co.	Ingersoll-Rand Co.
Climax Eng. Co.	Sauerman Bros.
The Le Roi Co.	The Sterling Wheel-
J. D. Adams & Co.	barrow Co.
Monarch Tractors	Barnes Mfg. Co.

R. B. EVERETT & CO.

3112-3116 Harrisburg Boulevard, Houston, Texas

Representing:

Lakewood Eng. Co.—Concrete Mixers, Handling Equipment.
 Erie Steel Construction Co.—Batcher Plants.
 Clyde Iron Works Sales Co.—Hoisting Machinery.
 Harnischfeger Corp.—Gasoline Cranes, Draglines, Shovels, etc.
 Universal Form Clamp Co.—Form Clamps.
 McKiernan-Terry Drill Co.—Pile Hammers, etc.
 Novo Engine Company—Gasoline Engines and Outfits.
 Littleford Brothers—Asphalt Kettles and Tools.
 Wyoming Shovel Works—Red Edge Shovels and Picks.
 Cleveland Wheelbarrow Co.—Red Star Wheelbarrows.
 Bates Valve Bag Co.—Wire Reinforcing Ties.
 Lee Trailer & Body Co.—Trailers and Dump Bodies.
 Patent Scaffolding Co.—Safety Swinging Scaffolds.
 Barber-Greene—Conveyors, Ditchers, and Wagon Loaders.
 Emerson Pump and Valve Company, Inc.—Steam Pumps.
 Buffalo Springfield Roller Co.—Road Rollers.
 Sullivan Machy. Co.—Air Compressors.
 Cyclone Fence Co. Sauerman Bros.—Cableways, etc.
 Member: Associated Equipment Distributors

LEWTER F. HOBBS Inc.National Bank of Commerce Bldg.
Norfolk Virginia**CONTRACTORS' EQUIPMENT**

Knickerbocker—Concrete Mixers, Saw
 Rigs, Mortar Mixers.
 Penna. Asphalt Plants.
 Stroudsburg Hoists.
 Speeder Cranes.
 Hotchkiss Forms.

F. W. GARTNER COMPANY

3315 McKinney Avenue HOUSTON, TEXAS

Contractors' Equipment

Rex Mixers & Pavers	O. H. & E. Pumps, Saw Rigs
Blaw Knox Batcher plants,	Hoists
Clamshell Bins, Turn Tables	Mathews Gravity Conveyors
and Buildings	Pape Dragline Buckets
Carbide Lights	National Hoist Engines, Pile
Climax Trustworthy Engines	Hammers
Le Roi Engines	Edwards Bar Cutters, Benders
Rogers Brothers Trailers	Eagle Dump Wagons
Erie Road Rollers	Blystone Mixers
Parsons Trenching Machines,	Hombert Kettles
Backfillers	Roughan Paving Gangs
Northwest Crawler Cranes,	Abcon Cement Tools
Gas Shovels, Draglines	McCleod Oil Burners
Anthony Dump Bodies	M & M Form Clamps
Archer Concrete Equipment	Heroules Engines
Koppel Industrial cars	Plymouth Locomotives
Geo. Haisc Loaders, Conveyors	Mundie Air Compressors

**GRAHAM BRIGHT
SALES COMPANY, Inc.**

901 Electric Bldg. Richmond, Va.

REPRESENTING

The Harnischfeger Corporation
 The T. L. Smith Company
 The Domestic Engine & Pump Company
 The Easton Car & Construction Company
 The George D. Whitcomb Company
 The Acme Road Machinery Company
 The Chicago Automatic Conveyor Company
 The Russell Grader Mfg. Company
 The Clyde Iron Works
 The Erie Steel Construction Company
 The Hotchkiss Steel Products Company
 And Other Well Known Manufacturers

THE C. H. JONES COMPANY

Contractors and Railway Equipment

206 So. West Temple St., Salt Lake City, Utah

Representing

The Jaeger Machine Co., Concrete Mixers and Pavers.
 Chain Belt Co., Chains, Sprockets, Elevating Machinery.
 H. W. Caldwell & Son Co., Conveying & Transmission Machy.
 Link-Belt Co., Cranes, Draglines and Shovels.
 U. S. Cast Iron Pipe & Fdry. Co., Water Works Supplies.
 The Diamond Rubber Co., Belting, Hose and Packing.
 The Buda Co., Track Supplies, Railway Equipment.
 Wm. H. Keller, Inc., Pneumatic Rods and Accessories.
 The Master Builders Co., Concrete Hardeners.
 Chicago Perforating Co., Perforated Metals of all Kinds.
 Interstate Iron Steel Co., Iron, Steel Products.
 Wilmington Fibre Specialty Co., Vulcanized Fibre Sheets, Rods
 and Tubes.

Stocks are carried in our Salt Lake warehouse and we solicit your inquiries and orders.

EARNST BROS.

805 E. Franklin St., Richmond, Va.

REPRESENTING

KOEHRING Mixers, Pavers, Cranes, Bar Cutters
 and Benders.
 BLAW-KNOX Steel Forms, Steel Bins, Measuring
 Batches, Clamshell Buckets, Truck
 Turntables, Inundation.
 O. H. & E. Power Pumping Outfits.
 KEYSTONE Excavators, Gas and Steam Shovels.
 ORD Finishing Machine.
 INSLEY Mfg. Co.
 AND OTHER WELL KNOWN PRODUCTS

GENERAL UTILITIES CO., Inc.

256 Tazewell St. Norfolk, Virginia

Representing

Chain Belt Co.	C. B. Johnson Co.
Barber-Greene Co.	Charles Hvas & Co.
Fate-Root-Heath Co.	Barnes Mfg. Co.
Heltsel Steel Form &	Lee Trailer & Body Co.
Iron Co.	Northwest Engineering
Byers Machine Co.	Co.
Huber Mfg. Co.	Atia Corp.
Elgin St. Sweeper Co.	Signs of Safety Co.
Luck Sewer Equip. Co.	Saagen Derrick Co.

Member: Associated Equipment Distributors

GEO. E. HOPPE801 McDonough Street
RICHMOND, VA.

Representing

Barnes Manufacturing Co.
 Cement Block Machinery Co.
 D-A Lubricant Co.
 Geo. Haisc Manufacturing Co.
 Jaeger Machine Co.
 The Link-Belt Co.
 Norlane Motor Oils
 Van Guilder System Conc. Bldgs.
 Member: Associated Equipment Distributors

Southern Machinery & Supply Co. Roanoke -:- Virginia

"All Kinds of Machinery"

REPRESENTING

The Osgood Company
Vulcan Iron Works
Ingersoll-Rand Co.
Chain-Belt Company
The Novo Engine Co.
Insley Manufacturing Co.
Geo. Haiss Manufacturing Co.
Curtis Pneumatic Machinery Co.
Union Steam Pump Co.
Littleford Bros.
Orr & Sembower

Contractors' Equipment in Stock in our Roanoke Warehouse.

HOFIUS-FERRIS EQUIPMENT CO.

1118-1124 Ide Avenue
SPOKANE, WASHINGTON

Distributors:

Caterpillar Tractors	RED EDGE Shovels
Russell Graders	Williams Buckets
Erie Shovels	Novo Engines and Out-
Rex Mixers and Pavers	fits
Sterling Wheelbarrows	Saugen Derricks
Logging and Construction Machinery.	

Member: Associated Equipment Distributors

Pacific Hoist & Derrick Co. Machinery and Equipment

818 First Avenue South, Seattle

Distributor

Blaw Knox Co.—Clam Shell Buckets, Steel Forms and Prudential Steel Buildings.
T. L. Smith Company—Concrete Mixers.
G. D. Whitcomb Company—Gas Locomotives.
Page Engineering Company—Page Scraper Buckets.
Pioneer Bucket Co.—Slack Line Buckets.
Mundy Hoisting Equipment—Hoisting Machinery
Insley Manufacturing Co.—Concrete Placing Equipment, Steel, Derricks.
Northwest Engineering Company—Northwest Crawler Crane Shovel and Dragline.

Member: Associated Equipment Distributors

Clarksburg Supply & Equipment Co.

Clarksburg, W. Va.

Representing:

Truscon Products
Troy Wagon Works
Trailers and Wagons
The Carborundum Company
Rubbing Stones
The Dow Chemical Company
Calcium Chloride
Albert Grauer Company
Sidewalk Lights
Martin Steel Products Company
Steel Culverts
Ransome Concrete Machinery Company
Concrete Mixers

STAR MACHINERY CO.

1741-1st Ave. So. Seattle, Wash.

CONTRACTORS' EQUIPMENT

Representing

Wonder Concrete Mixers, Hoists, etc.
Twentieth Century Mixers
Ideal Concrete Block Machinery
Silver Band Saws, Saw Tables, etc.
Irrington Swing Saws and Saw Tables
Curtis Air Compressors and Fordson Unit
Westinghouse Motors

WEST VIRGINIA MINE SUPPLY CO.

CLARKSBURG, W. VA.

"Everything for the Contractor"

REPRESENTING

Osgood—Steam and Gas Shovels and Cranes
Novo—Engines, Pumps and Hoists
Sullivan—Portable Air Compressors and Tools
Stockland—Quick-Lift Graders
Schramm—Air Compressors
Western—Wheeled, Drags and Plows
Burch—Stone Spreaders and Unloaders
Kwik-Mix—Tilting Drum Concrete Mixers
O. & S.—Steam Engines and Boilers
Goulds—Pumps, All Styles
Sterling—Wheelbarrows
Full line hose, belting, packing, Drill steel, Jackhammers, Shovels, Tools and Supplies.
Atlas Explosives and Blasting Supplies.

GENERAL MACHINERY CO.

Engineers and Machinery Merchants

SPOKANE, WASH.

Agents for High-Grade Equipment

Harnischfeger Corp.
C. D. Edwards Mfg. Co.
Ransome Concrete Machinery Co.
Hercules Motor Corp.
Chicago Pneumatic Tool Co.
De Laval Steam Turbine Co.
John A. Roebling Sons' Co.
Acme Road Mch. Co.

Members: Associated Equipment Distributors

Banks-Miller Supply Company

Huntington, W. Va.

Representing

Austin Western Graders, Crushers, Drags.	Ingersoll-Rand Com-
Burch Unloaders and Spreaders.	pressors and Drills.
Carey Expansion Joint.	Knickerbocker Con-
Caterpillar Tractors and Parts.	crete Mixers.
Draw Pipe Reinforcing Steel Cement.	Multi-Foot Pavers.
Farquhar Engines and Boilers.	New Holland Stone Crushers.
Handy Cement Sack Cleaners.	Northwest Gasoline Shovels.
Helstal Steel Road Forms.	Novo Hoists and Pumps.
	Watson Dump Wagons.
	Wonder Concrete Mixers.

See Dove Hall About Caterpillar Tractor and Parts

BOEHCK MACHINERY CO., INC.

2404-06 Clybourn St., Milwaukee, Wis.
 Inley—Steel Towers, Steel Derricks, Excavators
 T. L. Smith—Concrete Mixers, Concrete Pavers
 Allis-Chalmers—Crushers, Pumps, Motors, Compressors
 W. Teasdale & Sons—Elevators, Screens
 G. H. Williams—Cannibal Buckets
 Mundy Hoisting Equipment—Hoisting Engines
 L. P. Green—Drag Scraper Buckets
 New Engine Co.—Gasoline Engines, Air Compressors, Pumping
 Outfits, Hoisting Outfits
 J. P. Curry Co.—Wire Ties and Tools
 H. W. Rose Co.—Rockers
 Symons—Column Clamps
 Waukegan Motor Co.—Industrial Power Units
 Snow-King—Rotary Snow Plows
 Pioneer—Black Line Buckets
 Mead-Morrison—Tractors, Spreader-Shovels
 Warner—Wagons
 Jensen Superior Woodworkers
 Member: Associated Equipment Distributors

**ENGINEERS AND CONTRACTORS
SUPPLY CO.**

Office:
 228 - 3rd St.,
 Milwaukee, Wis.

Warehouse:
 West Allis,
 Wis.

DISTRIBUTORS FOR WISCONSIN

Anchor Concrete Machinery Co.
 Blystone Manufacturing Co.
 Emmel Manufacturing Co.
 Complete Concrete Product Plant Equipment.
 Complete Contractors' Equipment.
 Milwaukee Stock.

CHADWICK BROS. CO.**CONTRACTORS' EQUIPMENT**

2430 CLYBOURN ST. MILWAUKEE

Phone: West 7070

BYERS BEARCAT Shovels, Ditchers, Skimmers and Cranes	B A R B E R-GREENE Loaders, Trenchers, Portable and Permanent Conveyors
LEACH Mixers, Pavers	
HELTZEL Batchers and Bins Steel Forms	LEE Gravity Dump Bodies
OWEN Buckets	"CLETRAC" Tractors

HUNTER MACHINERY CO.

MILWAUKEE, WIS.

Warehouse, Shop and Office on 18th St. Viaduct near S. Canal St.

Carrying in Stock

Chain Belt Mixers	Davenport Locomotives
Clyde Hoists	Wisconsin Motor Co., Power Units
Blaw-Knox Buckets, Bins and Road Forms	Atlas Adjustable Shores
Northwest Cranes and Shovels	Ransome Concrete Machinery Co., Concrete Chuting Equip- ment
Leschen Wire Ropes	Syntron Electric Hammers
Atlas Engr. Co., Conveyors	Buffalo-Springfield Rollers
Parsons Tranching Machines	Highway Trailer Co., Trailers
Seagon Derricks	Ord Concrete Road Finishing Machines
Western Wheeled Scrapers	Barnes Mfg. Co. Pump's Outfits
Carble Lights	
Sullivan Compressors	

Member: Associated Equipment Distributors

Cunningham - Ortmayer - Company

14 Grand Avenue Milwaukee, Wis.

Construction and Industrial Equipment**DISTRIBUTORS**

Lakewood Engineering Co.	Road Finishers, etc.
Butler Bin Co.	Bins & Hoppers
Wyoming Shovel Works	Rad Edge
MacWhitty Company	Wire Rope
Mixermobile Corporation	Mixer-Ford Mounted
Keystone Driller Co.	Excavators, etc.
Chicago Pneumatic Tool Co.	Air Compressors, etc.
O. K. Clutch & Machinery Co.	Hoists
Wehr Company	Power Graders
Universal Crane Company	Truck Cranes

Member: Associated Equipment Distributors

GEORGE H. MUELLER CO.

6092 Plankinton Arcade Bldg., Milwaukee, Wis.

Representing:

KOEHLING CO.
 Concrete Mixers and Pavers
 Bar Cutters and Benders
 Cranes, Draglines and Shovels
 Subgraders

C. H. & E. MFG. C.
 Hoists
 Pumps
 Elevator Cages
 Saw Rigs
 Mortar Mixers

JAEGER MACHINE CO.
 Concrete and Plaster Mixers
 Placing Plants

EEEE

All Steel Hand Hoists

E. A. Drott Tractor Co.

Plankinton Arcade Building

Milwaukee

Wisconsin

REPRESENTING

"Caterpillar" Tractors—Caterpillar Tractor Co.	
Wausau Snow Plows	—Wausau Iron Works
Hi-Way Speedplows	—Hi-way Service Corp.
Baker Maney Scrapers	—Baker Mfg. Co.
Big Red Snow Fence	—Illinois Wire & Mfg. Co.

**Mullins Body & Tank
Company**

47th Avenue and Rogers Street

MILWAUKEE, WIS.

Wisconsin Distributors for:

WOOD-DETROIT Hydraulic Hoists,
 Automatic Gravity Bodies.
 SAFTEE Hand Hoists and bodies.
 Mead-Morrison Motor Truck Winches.

WATER METERS



The Tropic—An all-bronze Water Meter, with connection spuds attached to the lower case. Particularly designed for warm sections of the country.

The Arctic—A frost-bottom Water Meter, especially designed for cold sections of the country.

These two meters embody exactly the same mechanical features, the only difference being the changes necessary to provide a frost-breaking feature in the Arctic.

Either of these meters will be equipped with a COMPLETELY ENCLOSED intermediate train RUNNING IN OIL, if desired.

Write or wire nearest office for full information.

PITTSBURGH METER CO.

7800 Susquehanna St. Pittsburgh Pa.
New York Chicago Kansas City
Columbia, S. C. Seattle Los Angeles

48½"
PRESSED
STEEL
PLATE
DRUM
—
700 LBS.
LESS
DEAD
LOAD
ON ENGINE

BOSS
ONE-TWO
BAGGER

A SENSIBLY SIZED MIXER FOR ANY JOB
ONE BAG 1-3-6 OR TWO BAGS 1-2-4
WEIGHS NO MORE... COSTS NO MORE
THAN OTHER COMPANY ONE BAG MIXERS

WRITE FOR NEW LOWER 1935 PRICES—TERMS
Drum Mixers, 50, 75, 100, 140, 210, 285. Also FAVERIS
The American Cement Machine Co., Inc.
Keokuk Iowa
THE HUBBARD ELECTRIC CO.
Branch Offices and Warehouses
in All Principal Cities

**WAXY ROLLER
BEARINGS
SAVE POWER
CARRIES 30 DAYS
OIL SUPPLY**

BOSS HOISTS
\$135 UP-5 to 35HP

175-4
TRAILER

FILTERS 35-55-75

PITOMETER SURVEYS

FIND LEAKS AND STOP WATER WASTE
52 CHURCH ST. PITOMETER COMPANY NEW YORK CITY

DID YOU READ PAGES 3 TO 39?

Beattie Machinery Co. CONTRACTORS' EQUIPMENT

1946 Baker St. Detroit, Mich.

REPRESENTING

Sullivan Machinery Co.—Compressors & Air

Tools

Leach Oshkosh Co.—Mixers & Saw-rigs

Humphreys Mfg. Co.—Pumps

Le Roi Engine Co.—Engines

Saugen Derrick Co.—Derricks

Flory Mfg. Co.—Hoists

J. N. Fauver Co., Inc.—Dot Lubricating Pressure

System

Blystone Mfg. Co.—Plaster Mixers

Miles—Cement Block Machines

Chase—Industrial Cars

Rocktile—Automatic Units

Kent—Continuous Mixers

Mastercrowl—Long Handled Finishers

TWIN DISC CLUTCHES

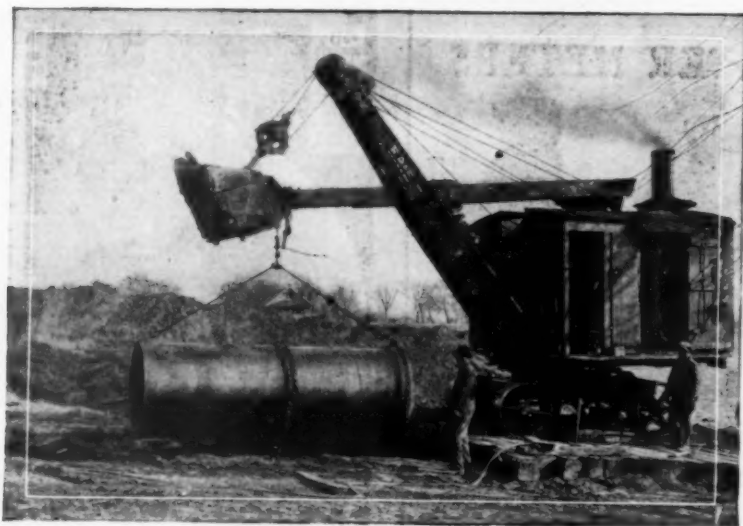
Meet fully all requirements of power control in motor driven machinery—stand up under strenuous work—easy to adjust—long lived.

TWIN DISC CLUTCH COMPANY

RACINE

WISCONSIN

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.



60" pipe placed by steam shovel

U. S. Cast Iron Pipe is easy to handle

*—and with the ordinary
equipment on the job*

The installation of Cast Iron
Pipe lines is therefore simplified
and costly delays are obviated.

Write for a copy of "United States
Cast Iron Pipe Handbook." It con-
tains valuable data for engineers.

United States Cast Iron Pipe and Foundry Company

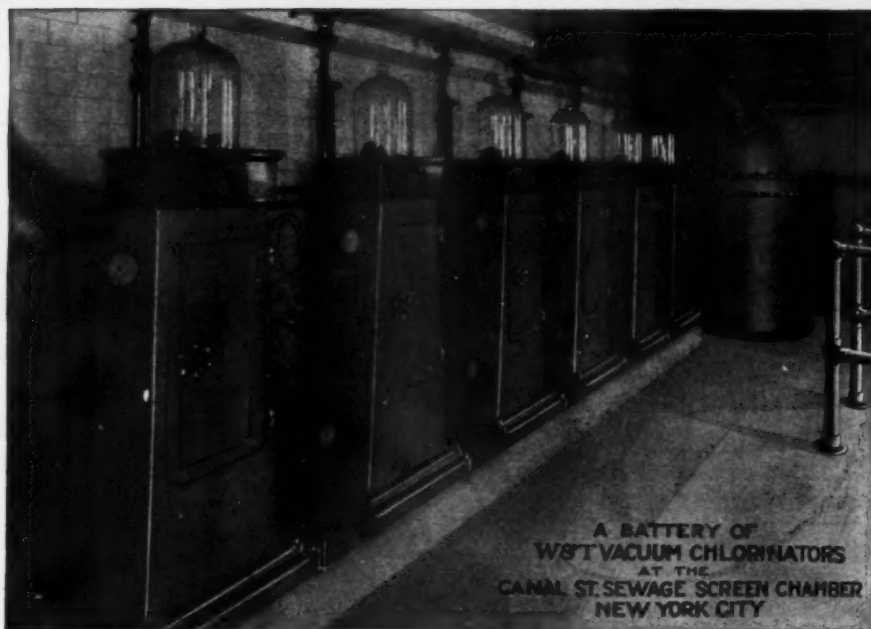
SALES OFFICES

Philadelphia	New York
Chicago	San Francisco
Birmingham	Pittsburgh
Buffalo	Dallas
Cleveland	Kansas City
Minneapolis	

General Offices:

Burlington, New Jersey

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.



A BATTERY OF
W & T VACUUM CHLORINATORS
AT THE
CANAL ST. SEWAGE SCREEN CHAMBER
NEW YORK CITY

The W & T Vacuum Chlorinator

LONG LIFE

The first vacuum chlorinator is still in operation.

ACCURATE

Indicates the true chlorine flow—average error negligible.

SIMPLE

No diaphragm valves on the chlorine supply.

LEAK PROOF

Any leak would be into the apparatus—because of the vacuum.

NON-CORRODIBLE

Silver—platinum—glass—hard rubber—nothing else comes in contact with wet chlorine.

VISIBLE CONTROL

The glass bell jar lets you see what is going on.

LOW UP-KEEP

Averages less than 1% per year.

EFFICIENT

The vacuum completely empties the chlorine cylinders.

Write for Technical Publication No. 38N

"The only safe water is a sterilized water"



WALLACE & TIERNAN

COMPANY, INCORPORATED

NEWARK

NEW JERSEY



NEW YORK CHICAGO KNOXVILLE SAN FRANCISCO MINNEAPOLIS PITTSBURGH DALLAS KANSAS CITY
SEATTLE ST. LOUIS BUFFALO HARRISBURG BOSTON INDIANAPOLIS CORTLAND, N. Y.
WALLACE & TIERNAN, LTD., TORONTO, CANADA

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.



AQUAFAX is a 56-page, monthly magazine giving current news and accurate information regarding the conservation of water. The regular subscription price is \$1.00 per year, but it will be sent free upon request to engineers, municipal heads and civic organizations.

Send for a copy of the 56-page book illustrating and describing all types and sizes of Neptune Trident Meters.

THAT the demand for Neptune Trident Meters is becoming more nearly universal every day, is evidenced by the above maps of the world. The darkened portions show the countries where Trident Meters are in use. The reason for this growing appreciation of Tridents is their record of dependable accuracy, durability and low maintenance cost in long years of service. Then, too, Tridents are practically proof against corrosion and the deteriorating elements of varying climates.

Study the results in any city—in any country—where Tridents are in service—you will learn the *facts* concerning a water-measuring instrument that definitely measures up to every requirement of water engineers and waterworks officials. This is why there are more than 3,000,000 Tridents in service.

NEPTUNE METER COMPANY

Pioneers in Meter Progress

50 EAST FORTY-SECOND STREET, NEW YORK CITY
NEPTUNE METER CO., LTD., 1197 KING STREET, WEST, TORONTO, ONT.

Boston Chicago San Francisco Atlanta Los Angeles Seattle Portland St. Louis, Mo.

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

DIRECTORY of ENGINEERS, CONTRACTORS, ARCHITECTS, ETC.

**INTELLIGENT
PLANNING**
**PROPER
CONSTRUCTION**
ALBRIGHT & MEBUS
Civil Engineers

Town planning and municipal improvements, parks, drainage, sewerage and sewage disposal.

 1502 Locust Street
PHILADELPHIA

GEORGE L. BEAN

 801 N. Broad Street,
PHILADELPHIA, PA.

 Water Supply; Water Works.
Reports, Design, Appraisals.

THOMAS F. BOWE
CONSULTING ENGINEER

 REPORTS WATER, SEWERAGE,
VALUATION TREATMENT OF
DESIGN SEWAGE
OPERATION INDUSTRIAL PLANTS

 110 William Street,
New York City

BANKS & CRAIG

51 East 42nd St., New York City

 709 Telegraph Building
Harrisburg, Pa.

 721 District National Bank
Washington, D. C.

 Municipal, hydraulic and sanitary
engineers.
Design, operation, valuation

BLACK & VEATCH
Consulting Engineers

 Water Supply, Water Purification,
Sewerage, Sewage Disposal, Power
Plants, Valuations, Special Investiga-
tions and Reports.

 E. B. BLACK N. T. VEATCH, Jr.
Mutual Building KANSAS CITY, MO.

Chester Engrs., The J. N.

 J. N. Chester D. E. Davis
J. P. LaBoos J. T. Campbell
E. R. Bankson

 Consulting, Hydraulic, Sanitary
and Valuation Engineers.

Union Bank Bldg. Pittsburgh, Pa.

FREDERICK SNARE CORPORATION
Contracting Engineers

114 Liberty Street, New York

 Harbor Works, Railroads, Bridges, Industrial Plants, Sugar Plants, Steel and Masonry Construction,
Pipe Lines, Water Works.

 Cable Address, Santee, New York.
Cable Address, Pawnee, Havana.

 Western Union and Lieber Codes Used.
Havana Office, Zulueta 86 D.

W. E. Conard

J. S. Buzby

CONARD & BUZBY

BURLINGTON, N. J.

Specialists on Water Works—

 Materials
Specifications

 Inspections
Reports

 Designs
Tests

OVER HALF A CENTURY IN CHICAGO

THE EDGAR A. ROSSITER CO.
CONSULTING ENGINEERS

160 North LaSalle St., Chicago

 Water supply, sewerage, and sewage disposal, drainage, farm and levee-pumping plants,
electric light systems, pavements, track elevation, tunnels, mining.

PERINE & COMPANY
ACCOUNTANTS AND AUDITORS

Audits — Accounting Investigations — Systems

EXPERIENCED AS ACCOUNTANTS SINCE 1898

 Singer Building
140 Broadway
New York City

 Investment Building
15th & K Sts., N. W.
Washington, D. C.

NICHOLAS S. HILL, Jr.
CONSULTING ENGINEER
WATER SUPPLY—SEWAGE DISPOSAL—HYDRAULIC DEVELOPMENTS.

 Reports, Investigations, Valuations, Rates, Design, Construction, Operation,
Management, Chemical and Biological Laboratories

112 East 19th Street

New York City

FULLER & McCLINTOCK
ENGINEERS

New York, 170 Broadway

PHILADELPHIA, PA., 1001 Chestnut St.
TOLEDO, OHIO, 332 Summit-Cherry Bldg.
KANSAS CITY, MO., 600 Walnut Street
WEST PALM BEACH, FLA., Room 2, Realty Bldg., 1134 So. Palmstreet St.**T. H. MANDELL**

CIVIL ENGINEER

Design and Supervision of Construction

Highways	Bridges
Paving	Structures
Sewerage	Surveys
Drainage	Reports
Railroads	Estimates

 Frank Bldg., Lake Charles, La.
Clyde Potts

38 CHURCH ST. NEW YORK

Civil and Sanitary Engineer

Sewerage and Sewage Disposal Works.
Hydraulics, Water Works, Filtration,
Reports, Plans and Estimates.

Have you looked over catalog items on pages 114 and 116, for interesting data on new machinery and equipment for Contractors and Engineers?

Midwest Laboratories

Webster City Iowa

Asphalt-Concrete Aggregates—Paving—Water Supply—Sanitation—Special Problems. Chemical Analyses—Physical Tests—Field and Laboratory Inspection—Consultation.

HARVEY STANLEY

Consulting, Designing and Supervising Engineer

Bridges, Buildings and Miscellaneous Structures. Alternate Designs for Bridges. Reports and Assistance in Financing.

Miami and Ft. Lauderdale, Fla.

New York City 116 West 39th St.

A. E. HANSENHydraulic & Sanitary Engineer
Design & Supervision of Construction
Sewerage Water Works
Sewage Disposal Water Purification
Drainage Water Works
Valuation
Expert Services in Litigation**Mullergren, Arthur L.**

Consulting Engineer

Specialist in Electric Light, Power and Water Pumping.

Kansas City, Mo., 555 Gates Building.

DR. D. B. STEINMAN,M. Am. Soc. C. E., M. Am. Ry. Eng. Ass.
CONSULTING AND DESIGNING ENGINEER

Bridges and other Structures. Engineering Projects. Design, Supervision, Investigations, Reports, Valuations, Advisory Service.

35 Church Street New York

Harrison Mertz & Emlen Inc.,

Engineering & Construction.

Sewage Disposal, Water Supply
Landscape Contracting.
Franklin Bank Building,
Philadelphia, Pa.**New York Testing Laboratories**Chemical & Physical Tests, Microscopical Examinations.
Electrical Tests, Power Plant Tests, Expert Inspections, Cities and Industries.

80 Washington St., New York City

DID YOU READ

Pages 3 to 39

The "Where to Purchase" Section contains the names and addresses of the leading manufacturers and supply dealers. This is the quickest way to secure favorable prices and other information.

HAZEN & WHIPPLECONSULTING HYDRAULIC and SANITARY ENGINEERS
WATER SUPPLY and SEWERAGEAllen Hazen L. M. Babbitt
O. M. Everett Malcolm Pirnie
26 W. 44th Street New York**PEASE LABORATORIES, Inc.**

Formerly

LEDERLE LABORATORIES

Sanitary, Bacteriological and Chemical Investigations for the Community or Individual

89 W. 38th St., N. Y. City

CORNELIUS C. VERMEULE

Consulting & Designing Engineer

Water Supply, Sewerage, Power Plants.

Valuations and Reports on Industries and Public Utilities.

38 Park Row, New York

Clark E. Jacoby Engineering Co.

Consulting Engineers

River and Flood Control, Water Power Development, Land Reclamation, Drainage, Topographic Surveys, Bridges, Reinforced Concrete.

Interstate Bldg.
KANSAS CITY, MO.**CLARENCE D. POLLOCK**

Member Am. Soc. C. E.

Consulting Engineer.

Pavements, Highways, Drainage, Sewerage, Town Planning and General Municipal Problems.

Reports, Specifications, Supervision.
Park Row Building, New York City.**GERALD J. WAGNER**

Consulting Electrical Engineer

GRAND RAPIDS, MICH.

Consultant for Municipalities on Gas, Street Railway, Electric and Telephone Problems.

The JENNINGS-LAWRENCE CO.

CIVIL AND MUNICIPAL ENGINEERS

811-12 Hartman Bldg.
COLUMBUS OHIO**Alexander Potter, C. E.**

Hydraulics, Sanitation, Concrete Structures Designed Executed.

50 Church Street, New York
(Hudson Terminal) Tel. Cordado 5501**Gilbert C. White, G. E.**

M. Am. Soc. C. E.

M. Am. Soc. M. E.

CONSULTING ENGINEER

Durham, N. C.

An organization of Civil, Mechanical, Electrical and Chemical Engineers. Waterworks, Streets, Power Plants.

Landreth, Olin H.,

Consulting Engineer.

Hydraulic and Sanitary Engineering. Consultation, Investigation Valuation.

New York, No. 156 Fifth Ave.

G. E. SMITH & CO.

CONSULTING ENGINEERS

2073 Railway Exch. Bldg., St. Louis, Mo.

Investigations, reports, appraisals, expert testimony, bridge and structural work, railway problems, electrification, grade crossing elimination, foundations, highways, docks, water supply, river and flood protection, drainage and sanitation, power plants.

THOS. H. WIGGIN

CONSULTING ENGINEER

415 Lexington Ave., New York City

Reports, Designs, Supervision, Valuation: Water Supply, Sewerage, Flood Control, Tunnels.

NEWARK REINFORCED CONCRETE PIPE

Newark
REINFORCED CONCRETE PIPE
"It makes a better joint"

Contractors who have had experience with practically all types of precast reinforced concrete pipe have expressed their hearty approval of the NEWARK type of joint, as they have found it is the cheapest form of joint to lay properly.

NEWARK CONCRETE PIPE CO.

462 BROAD ST.

NEWARK, N. J.

NEWARK, N. J.

BUFFALO, N. Y.

DOVER, N. J.

ROCHESTER, N. Y.

CLEVELAND, O.

UNION WATER METER CO.

Worcester, Mass.

Union Water Meter Company is one of the few American manufacturing concerns that has progressed sixty years under the same ownership. This pioneer company began in the early sixties and incorporated in 1868 the organization which has won a place of leadership in the manufacture of water meters, valves, stops, pipe lining equipment and fire whistles. Catalog G-54 sent on request.

New York Office: 50 Church St.

Philadelphia Office: 539 Real Estate Trust Bldg.

ALDRICH

THE ALDRICH PUMP COMPANY

FOOT OF PINE STREET
ALLENTOWN, PENNA.

REPRESENTATIVES WANTED

Single Suction
Double Suction

CENTRIFUGAL

Single Stage
Multi Stage

PUMPS

INDEX TO ADVERTISERS IN THIS ISSUE

Aberthaw Company	174	Beckwith Machinery Co.....	186	Clinton & Held.....	160
Abram Cement Tool Co.....	152	Belle City Mfg. Co.....	185	Clyde Co.....	173
Acme Road Machinery Co.....	136	Bingham, J. L.....	179	Clyde Equipment Co.....	184
Aeroll Burner Co.....	150	Blaw-Knox Co.....	43	Clyde Iron Works Sales Co.....	137
Akron Barrow Co.....	36	Blystone Mfg. Co.....	124	Coan Equipment Co.....	148
Alamo Engine Co.....	129	Bond Co., The.....	190	Coast Machinery Corp.....	167
Aldrich Pump Co.....	107	Borchert Ingersoll Co.....	174	Collins Kay Machinery Co.....	163
Alexander, Edgar.....	170	Boston & Lockport Block Co....	152	Conard & Buxby.....	195
American Cement Machine Co....	191	Brandeis Machy. & Supply Co....	173	Conboy Co., John A.....	184
American Saw Mill Machy. Co....	164	Brewster & Williams, Inc.....	181	Concrete Mach'y & Supply Co....	168
American Steam Pump Co.....	156	Bright Sales Co., Inc., Graham..	188	Concrete Surfacing Machy. Corp.	160
W. H. Anderson Tool & Supply Co.....	175	Brooks Co., R. E.....	180	Connelly & Co.....	154
Anthony Company.....	130	Brown-Bevis Co., Inc.....	167	Construction Machy. Co. of Cal.	165
Armstrong & Bros., Co., R. S....	171	Brown, Fraser & Co.....	169	Construction Machy. Co.....	25
Army and Navy Supply Co.....	145	Brown, Thos. M.....	173	Continental Motors Corp.....	133
Atlas Engineering Co.....	144	Brown & Sites Co.....	180	Contractors Equipment Co....	175
Austin Machy. Co., W. B.....	171	Buffalo-Springfield Roller Co....	156	Contractors Equipment Co., Inc.	168
Austin-Western Road Mach'y Co.	153	Buhl Co.....	138	Coulter, N. A.....	171
Avery, O. B.....	177	Bunting Hardware & Machy. Co.	177	Craven, E. F.....	181
Bacon Co., E. R.....	160	Burch Plow Works.....	146	Cunningham, Ortmayer Co.....	190
Bacon Engineering Sales Co.....	182	Burnite Machy. Co.....	169	Curd Equipment Co., Geo. B.....	182
Baker Mfg. Co.....	124	Burress-Clark Machy. Co.....	170	Curtis Pneumatic Machy. Co....	132
Banks-Miller Supply Co.....	189	Byers Machine Co.....	91		
Barber Asphalt Co.....	200			Dallett Co., The.....	130
Barber-Greene Co.....	20	Cannon & Ashmead.....	170	D-A Lubricant Co., Inc.....	148
Barrett Co.....	97	Carey Co., Philip.....	40-41	Davis Engineering Co., C. B....	167
Barrett, Thos. L.....	173	Case, George D.....	179	Day & Maddock Co.....	182
Bartholow Co., J. W.....	187	Caterpillar Tractor Co.....	157	De Huff & Hopkins.....	185
Bates Manufacturing Co.....	136	Cement Block Machy. Co.....	142	Denver Rock Drill Mfg. Co.....	152
Bates Valve Bag Co.....	128	Chadwick Bros. Co.....	190	Dixon Crucible Co., J.....	166
Bay City Dredge Works.....	199	Chausse Oil Burner Co.....	160	Dixie Machinery Co.....	173
Beattie Machinery Co.....	191	Chicago Automatic Conveyor Co.	39	Dobbie Foundry & Machine Co..	142
		Clarksburg Supply & Equip. Co..	189	Dodge, C. R.....	174
		Cleveland Tractor Co.....	143	Dolan-Tucker Smith Equip. & Supply Co.....	171
		Climax Engineering Co.....	119	Domestic Engine & Pump Co....	149

(Continued on page 198)

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

INDEX TO ADVERTISERS IN THIS ISSUE

(Continued from page 197)

Dopp & Co., J. W.	175	Kellogg-Burlingame Co.	175	Roshalt Co., T. W.	176
Dow Chemical Co.	122-123	Kenney, G. C.	177	Rossiter Co., Edgar A.	195
Dravo Equip. Co.	171-179-185-186	Kentucky Rock Asphalt Co.	103	Ruane Machinery Co.	186
Drott Tractor Co., E. A.	190	Keystone Driller Co.	44	Ruggles Motor Truck Co.	95
Eagle Wagon Works.	150	Kiel Machine Company.	143	Russell Grader Mfg. Co.	164
Earnest Bros.	188	Kiesler Co., Jos. F.	128	Sasgen Derrick Co.	164
Easton Car & Construction Co.	103	Knox Engineering & Equip. Co.	172	Saunders Bros.	140
Edelen & Boyer Co.	185	Koebring Co.	26-141	Schaefer Wagon Wks., Gustav.	127
Engineering Products Co.	169-171	Kuhlman & Co., W. A.	148-183	Schramm, Inc.	42
Engineers & Const. Supply Co.	190	Lake Co., F. D.	175	Seibert-Milburn Co.	183
Equitable Asphalt Main. Co.	39	Lakewood Engineering Co.	42	Service Equipment Co.	185
Erickson Co., Inc., H. E.	176	Lane Equipment Co., T. J.	183	Service Supply Co.	185
Erie Steam Shovel Co.	6	Lansing Company.	134	Shannon & Co., Jacob J.	185
Erie Steel Construction Co.	118	La Plant-Choate Mfg. Co.	138	Sheehan & Co.	187
Essick & Co.	108	Latture Equipment Co., J. L.	184	Smith-Booth-Usher Co.	168
Euclid Crane & Hoist Co.	142	Lauson Mfg. Co., The John.	131	Smith & Co., Geo. F.	178
Everett & Co., R. B.	188	Littleford Bros.	125	Smith Co., T. L.	99
Everhot Mfg. Co.	146	Loggers & Contractors Machy. Co.	184	Smith Engineering Works.	90
Fairfield Engineering Co.	127	London Concrete Machy. Co., Ltd.	169	Snare Corporation, Frederick.	195
Fate-Root-Heath Co.	22	Long, Fred A.	170	Solvay Process Co.	165
Fennauyght Machinery Co.	184	Louder Co., W. B.	172	Southern Machy. & Supply Co.	189
Pife Equipment Co., George W.	172	Louis, John C.	174	Southern States Equipment Co.	173
Flory Mfg. Co.	154	Lufkin Rule Co.	144	Spears-Wells Machy. Co., Inc.	130
Ford Motor Co.	145	Lyons Machinery Co., Inc.	167	Staley & Morris, Inc.	185
Ford Power Equip. Exposition.	35	McCraken-Ripley Co.	184	Standard Machy. & Equip. Co.	186
Fraley, Lawrence V.	177	McDonald & Burgmen	170	Standard Oil Co. of Ind.	159
Fuchs Equipment Co.	178	McKiernan-Terry Drill Co.	34	Stanley & Gill Machinery Co.	170
Full-Crawler Co.	10	McNeilly, John	183	Star Machinery Co.	189
Fuller & Sons Mfg. Co.	2	Mack Trucks, Inc.	126	Steinbarger Co., H. N.	169
Funkhouser Equipment Co.	177	Malvese & Company, Geo.	179	Stewart Iron Works Co.	160
Gallon Iron Works & Mfg. Co.	101	M. & M. Form Clamp Co.	166	Street Bros. Machine Works.	32
Garlinghouse Bros.	168	Marion Steam Shovel Co.	142	Stuebner Iron Works, Inc.	144
Gartner Co., F. W.	188	Marion Steel Body Co.	184	Sullivan Machinery Co.	156
General Machinery Co.	189	Martin Machinery Co., E. A.	177	Superior Supply Co.	172
General Motors Truck Co.	121	Meyer Co., Henry H.	174	Talbot-Flood Mfg. Co.	148
General Utilities Co.	188	Miami Trailer Scraper Co.	153	Texas Co., The.	162
Gierke-Robinson Co.	172	Milburn Co., Alex.	164	Toledo Wheelbarrow Co.	89
Giles & Ransome.	185	Miller Equipment Co.	181	Tractor Grip Wheel Co.	10
Ginsberg-Penn Co., Inc.	180	Minneapolis Equipment Co.	176	Tractor & Equipment Co., Inc.	178
Godwin Co., W. S.	160	Minnesota Equipment Co.	176	Trevor Co., H. B.	179
Good Roads Machinery Co.	155	Moore, A. B., Jr.	171	Truscon Steel Co.	4
Good Roads Supply Co.	169	Moore Equip. Co., H. W.	169	Tulley Equipment Co.	178
Graham Bros.	139	Mueller Co., Geo. H.	190	Turner, John D.	167
Green & Co., G. S.	180	Mullins Body & Tank Co.	190	Twin Disc Clutch Co.	191
Hadfield-Penfield Steel Co.	151	Mundy Sales Corp.	111	Tyler Co., N. B.	174
Hais Mfg. Co., Geo.	120	National Supply Co., The.	183	Union Iron Works.	12
Hale & Co., Wm. H.	176	Neely & Co., J. C.	181	Union Water Meter Co.	197
Harnischfeger Corp.	14	Nelson Iron Works, N. P.	158	Universal Hoisting Mch. Corp.	138
Harris, R. L.	187	Neptune Meter Co.	194	Universal Road Machinery Co.	146
Harrill Supply Co.	187	Newark Concrete Pipe Co.	197	U. S. Cast Iron Pipe & Fdry. Co.	192
Hatcher Co., S. T.	178	Newport Culvert Co.	161	Van Keppel & Co., S. R.	183
Hauck Mfg. Co.	154	N. Y. Central Iron Works.	130	Vulcan Iron Works.	136
Haverstick & Co., Inc.	181	Nixon-Hasselle Co.	187	Wallace & Tiernan Co., Inc.	193
Hawley Tie Bolt Co.	105	Noble Co., E. B.	170	Ward Co., Lee T.	186
Hedge & Mattheis Co.	174	Norden Co., Wm. H.	180	Warford Corp.	147
Heil Co., The.	138	Northwest Equip. Co., Inc.	178	Warren Bros. Co.	128
Heltzel Steel Form & Iron Co.	115	Norton Co., J. B.	181	Waterhouse, Clifford.	177
Hercules Corporation.	135	Novo Engine Co.	126	Watson Truck Corp.	160
Hercules Motors Corp.	87	O'Brien Co., Inc., Martin J.	186	Waukesha Motor Co.	107
Herr, Henry R.	184	Oil Jack Co.	152	Western Block Co.	136
Highway Trailer Co.	140	Olsen, Ole K.	140	Western Contractors Supply Co.	172
Hill, Nicholas R.	195	O. E. Clutch & Machy. Co.	8	Western Material Co.	187
Hinckley Motors, Inc.	173	Orton Crane and Shovel Co.	8	Western Supply Co.	178
Hobbs, Inc., Lewter P.	188	Pacific Flush-Tank Co.	140	West Michigan Equipment Co.	176
Hobbs-Ferris Equipment Co.	189	Pacific Hoist & Derrick Co.	189	West Virginia Mine Supply Co.	189
Honhorst Co., Jos.	164	Pattison Supply Co., W. M.	182	Wettlaufer Bros.	175
Hoppe, Geo. E.	188	Peden Equipment Co.	182	Whayne Supply Co., R. C.	173
Hotchkiss Steel Prod. Co.	109	Pegg, E. F.	182	Wheeler Murray Co.	179
Hotel Knickerbocker.	150	Pennsylvania Cement Co.	144	Whinery, S. B.	180
Howard-Cooper Corp.	184	Perine & Co.	195	Whitcomb Co., Geo. D.	117
Hower, J. Shuman.	181	Perkins Co., P. L.	174	Wiard Plow Co.	150
Hubbard-Floyd Co., Inc.	180	Pickering Governor Co., The.	158	Wilkins, J. D.	181
Huber Manufacturing Co.	166	Pioneer Bucket Co.	136	Williams Co., W. W.	183
Hughes, W. E.	177	Pioneer Tractors Inc.	152	Williamsport Wire Rope Co.	38
Humphreys Mfg. Co.	128	Pitometer Co.	191	Wilson, J. Walker.	183
Hunter Machy. Co.	190	Pittsburgh Machy. & Equip. Co.	186	Wilson Machinery Co.	170
Hyland Co., R. H.	172	Pittsburgh Meter Co.	191	Wilson-Weesner Wilkinson Co.	187
Ingersoll-Rand Co.	18	Pope Equipment Co.	182	Wolverine Concrete Machy. Co.	175
Inaley Manufacturing Co.	24	Queen City Supply Co.	182	Wood Hydraulic Hoist & Body Co.	129
Interstate Machy. & Supply Co.	179	Rabbitt, C. F.	178	Yancey Bros.	171
Jackson Mfg. Co.	146	Raber & Lang Mfg. Co.	166	Young & Van Supply Co., The.	167
Johns Equipment Co., E. W.	172	Ransome & McClelland, Inc.	168	Zetterlund Hoist & Mach. Co.	131
Johnston Bros., Inc.	149	Ransome Concrete Machy. Co.	93	Ziegler & Co., Inc., Wm. H.	176
Jones Co., C. H.	188			Ziegler Machy. Co., Geo. W.	186
Kelley Co., E. B.	180				

For Directory of Consulting & Contracting Engineers, Landscape Architects, Etc., see pages 195, 196.

YOU NEED — The Best Skimmer Obtainable For Hard Shallow Road Cutting. — THE BAY CITY 16-B.

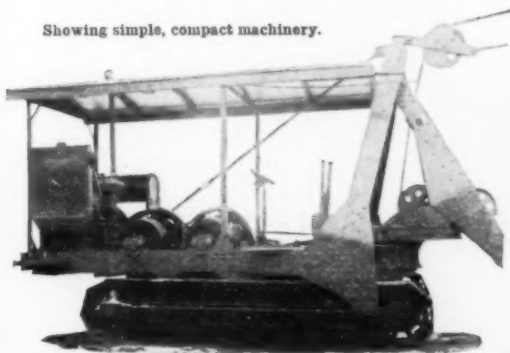


An Investment You'll Always Be Proud of

The fast, all steel "5 in 1" Bay City has long, full crawlers, with two propelling speeds and positive traction on turns. Built to endure hard service—not to sell at a price.

Operates Skimmer — Trencher
Shovel — Clamshell — Dragline

Showing simple, compact machinery.



SIX Bay City owners ordered their 2ND or 3RD Bay City 16-B during the month of March

BAY CITY DREDGE WORKS

New York Office: 302 Broadway

DREDGES
POWER SHOVELS
CRANES

BAY CITY, MICH.

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Easier to operate and safer
because of this new drum
and clutch



2 men operate it
and they make

4 cubic feet of
"Hot Mix" in

6 minutes of
working time

On this new improved Iroquois Rapid Mixer, the old style "nigger head" has been replaced by a hoisting drum operated by a clutch. This new feature eliminates the frequent cable troubles, affords greater safety to the operator, and results in quicker loading.

Here's how easily and rapidly this new Iroquois makes hot asphalt repair mixture:

Dump in the sand and filler
Pour in Genasco Liquid Asphalt
Add two pints of gasoline—light
Six minutes and it's ready to spread

The new Iroquois Rapid Mixer is small, compact, easily moved, and furnished complete with two 8" x 6" tampers, two 10½" x 6½" smoothers, 4 asphalt rakes, 2 asphalt cutters and 2 rattan push brooms.

NOTE: The hand roller shown in the illustration is not a part of the equipment furnished.

Get the complete details regarding this new Iroquois mixing plant. Write us today.

Iroquois Sales Department

THE BARBER ASPHALT COMPANY

New York Chicago Pittsburgh PHILADELPHIA St. Louis Kansas City San Francisco

IROQUOIS

REG. U. S. PAT. OFF.

Road-Building Machinery

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

